TRANSCRIPT OF RECORD

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1936

No. 41

THE UNITED STATES, PETITIONER

vs.

ROBERT ESNAULT-PELTERIE

ON WRIT OF CERTIORARI TO THE COURT OF CLAIMS

PETITION FOR CERTIORARI FILED APRIL 24, 1936
CERTIORARI GRANTED JUNE 1, 1936

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1935

No. 963

THE UNITED STATES, PETITIONER

vs.

ROBERT ESNAULT-PELTERIE

ON PETITION FOR WRIT OF CERTIORARI TO THE COURT OF CLAIMS

INDEX

	Original	Print
Record from Court of Claims	1	1
History of proceedings	1	1
Fourth amended petition	2	1
General traverse	9	5
Argument and submission of case	9	5
Further proceedings in case	9	5
Special findings of fact	11	6
Conclusion of law	40	38
Opinion of the court, Booth, Ch. J.	40	38
Judgment	75	75
Clerk's certificate [omitted in printing]	76	75

	Page
Order allowing certiorari	76

64298—36——1

1 In Court of Claims of the United States

No. D-388

ROBERT ESNAULT-PELTERIE

vs.

THE UNITED STATES

I. *History of proceedings*

The original petition in this case was filed June 20, 1924, by George W. Wickersham, Esq., as attorney of record.

On July 18, 1924, on motion made therefor and allowed by the court, Cadwalader, Wickersham & Taft were substituted as attorneys of record.

On August 20, 1924, the defendant filed a general traverse to said petition.

On December 13, 1924, on motion made therefor and allowed by the court, the plaintiff filed an amended petition.

On February 28, 1925, the defendant filed a general traverse to the amended petition.

On August 12, 1925, the plaintiff filed a second amended petition.

On March 26, 1927, on motion made therefor and allowed by the court, the plaintiff filed a third amended petition.

2 No demurrer, plea, answer, or notice of a counterclaim, set-off, claim for damages or demand in the premises having been filed by the defendant, a general traverse was entered by the clerk as provided by Rule 34.

On February 11, 1928, on motion made therefor and allowed by the court, the plaintiff filed a fourth amended petition which is as follows:

II. *Fourth amended petition*

Filed Feb. 11, 1928

To the Honorable the Court of Claims:

The Claimant, by Cadwalader, Wickersham & Taft, his attorneys, respectfully represents:

For a First Cause of Action

Upon Information and Belief

1. At all times hereinafter mentioned the Claimant has been and still is a citizen of the French Republic, and resides at 43 Boulevard Lannes, Paris, France, and was beyond the seas during June 1917, and since then was at no time in the United States before June 21, 1921.

2. The French Republic accords to citizens of the United States the right to prosecute claims against it in its courts, and such claims may include those for breach of contract and for the infringement of patents.

3 3. On or about the 3rd day of November 1914, letters patent No. 1115795 were duly issued in the name of the United States of America, under the seal of the Patent Office, and signed by the Commissioner of Patents, to the Claimant, upon his application therefor, for a certain new and useful invention theretofore made by the Claimant for the stabilization and control of airplanes, to wit: the control of the whole equilibrium of the machine by the simple oscillation of a single lever moving in all directions and operated by one hand, which has since become popularly known as the "joy stick." A further and fuller description of the invention therein patented will appear in said patent or a duly authenticated copy thereof here in Court to be produced. This invention was not known or used by others in this country before the Claimant's invention thereof and not patented or described in any printed publication in this or any foreign country, before the Claimant's invention or discovery thereof, or more than two years prior to the Claimant's application and not in public use or on sale in this country for more than two years prior to the Claimant's application. The said patent granted to the Claimant, his heirs or assigns for the term of seventeen years the exclusive right to make, use, and vend the invention covered thereby throughout the United States and the territories thereof. The Claimant and his agents have never made or sold the said patented article in the United States.

4. Thereafter, in June 1917 and continuously since that date and up to the present time, the invention described in and covered by the said patent was used and manufactured by and for the defendant, without license of the owner thereof, the Claimant, or lawful right to use or manufacture the same, in airplanes made and used by and for defendant in large amounts. Such airplanes

4 were manufactured by and for the defendant in the factories of the Curtiss Aeroplane and Motor Corporation, Buffalo, New York; Standard Aircraft Corporation, Elizabeth, New Jersey; Thomas-Morse Aircraft Corporation, Ithaca, New York; Wright-Martin Aircraft Corporation, Los Angeles, California; Sturtevant Aeroplane Company, Boston, Massachusetts; the Burgess Company, Marblehead, Massachusetts; L. W. F. (Lowe, Willard & Fowler) Engineering Company, College Point, Long Island, New York; Aeromarine Engineering & Sales Company, New York, New York; Boeing Airplane Company, Seattle, Washington; Dayton-Wright Airplane Corporation, Dayton, Ohio; Springfield Aircraft Corporation, Springfield, Massachusetts; Packard Motor Car Company, Detroit, Michigan, and other manufacturers in the United States, the total amount of such manufacture from June 1917, until November 11, 1918, being 11,754 airplanes. Further infringing airplanes were

manufactured by and for the defendant in large amounts since November 11, 1918, and up to the present time, the extent of which manufacture the Claimant is unable further to particularize without examining copies of Consolidated Reports in the War, Navy, and Post Office Departments respectively, by years and types, of the airplanes manufactured by and for those departments during the period above named. The Claimant applied for such Consolidated Reports to the War, Navy, and Post Office Departments respectively, but his applications were denied, as appears from the letters attached as exhibits to the motions filed by the Claimant in this Court November 18, 1924, for calls on the said departments for the said information and papers. After such denial by the said departments respectively and on November 13, 1924, the Claimant filed in this Court motions, as referred to above, for calls on the said departments respectively for the said information and papers. The said
5 motions were overruled by this Court November 25, 1924, on the defendant's objections thereto but with no hearing or other reply of the Claimant. The infringing airplanes were used by and for the defendant in the Army and Navy from June 1917 and up to the present time, and in the Post Office Department since May 15, 1918, and up to the present time. On or about the 29th day of November 1920, in Paris, France, the Claimant duly notified the defendant, through its representative, Colonel James J. Mayes, of such infringement, but defendant continued to make and use the patented article of the Claimant to his great damage. The damage caused the Claimant by the aforesaid manufacture and use is a large sum, to wit: One million one hundred seventy-five thousand four hundred dollars ($1,175,400.00), being the fair and reasonable value of a license under the Claimant's said talent for the said manufacture up to November 11, 1918, and use of his invention covered thereby, together with such further sum as will compensate the Claimant for the defendant's infringement in airplanes built since November 11, 1918, and up to the present time, which infringement the Claimant is at present unable further to particularize, as stated above in this paragraph. The above mentioned acts of infringement by and for the defendant give rise to a right of action in the Claimant against the United States in this Court by virtue of the Act of June 25, 1910, Chapter 423 (36 Stat., 851), as amended by the Act of July 1, 1918, Chapter 114 (40 Stat., 704, 705), and by virtue of Section 155 of the Judicial Code and by virtue of the International Convention concluded March 20, 1883 (25 Stat. 1372), as modified by the Additional Act concluded December 14, 1900 (32 Stat. 1936), as revised by the International Convention signed June 2, 1911 (38 Stat. 1645).

5. No action upon the Claimant's claim has been had by or
6 before Congress or any executive department of the Government, except that the Claimant presented his claim to the Secretary of War, who declined to allow it; and the Claimant never brought, nor has pending in any court, any suit or process against

any other person, firm, or corporation acting or professing to act mediately or immediately under the authority of the United States for or in respect of the claim herein presented.

6. The Claimant is the sole owner of this claim and the only person interested therein; and no assignment or transfer of said claim, or of any part thereof or interest therein, has been made.

6A. The Claimant is not and never has been in the employment or service of the Government of the United States.

7. The Claimant is justly entitled to the amount herein claimed from the United States after allowing all just credits and offsets.

8. The Claimant has not in any way voluntarily aided, abetted, or given encouragement to rebellion against the Government of the United States, and he believes the facts as stated herein to be true.

For a Second Cause of Action

Upon Information and Belief

9. The Claimant repeats all the allegations of paragraphs 1 and 2, as fully as if set forth at length herein.

10. On or about the 19th day of December 1906, the 19th day of January 1907, and the 22nd day of January 1907, letters patent Nos. 372753, 373763, and 373818, respectively, were duly issued by the French Republic to the Claimant for certain new and useful improvements in the control and stabilization of airplanes by a lever, as more fully will appear in said patents or duly authen-
7 ticated copies thereof here in Court to be produced. The said patents granted to the Claimant the exclusive right to make, use, and sell the inventions covered thereby throughout the territory of the French Republic.

11. Thereafter, from April 6, 1917, to November 11, 1918, and while said letters patent of the French Republic were in full force and effect, to the knowledge of the defendant, the inventions described in and covered by the said letters patent were used, manufactured, and vended by and for the defendant in the territory of the French Republic in airplanes made, used, and vended by and for the defendant in large amounts, to wit, 5.139 airplanes built for the defendant in France and England, and the defendant agreed to pay and the Claimant agreed to receive a reasonable compensation therefor, to wit, Five hundred thirteen thousand nine hundred dollars ($513,900.00).

12. No part of the said sum has been paid although it was duly demanded by the Claimant of the defendant through its representative, Colonel James J. Mayes, on or about the 29th day of November 1920, in Paris, France, which breach of the aforesaid implied contract gives rise to a right of action in the Claimant against the United States in this Court by virtue of Sections 145 and 155 of the Judicial Code.

13. The Claimant repeats all the allegations of paragraphs 5, 6, 6A, 7, and 8, as fully as if set forth at length herein.

Wherefore the Claimant prays that he may have judgment for One million six hundred eighty-nine thousand three hundred dollars ($1,689,300.00) together with fair compensation for the defendant's infringement in airplanes manufactured from November 11,
8 1918, and up to the present time, with such costs and interest as may be allowed, and to such further relief as may be just.

CADWALADER, WICKERSHAM & TAFT,
Attorneys for Claimant.

[*Duly sworn to by George W. Wickersham; jurat omitted in printing.*]

9 III. *General traverse*

Filed March 22, 1928

And now comes the Assistant Attorney General, on behalf of the United States, and answering the fourth amended petition of the plaintiff herein, denies each and every allegation therein contained; and asks judgment that the fourth amended petition be dismissed.

HERMAN J. GALLOWAY,
Assistant Attorney General.

IV. *Argument and submission of case*

On December 4, 1934, this case was argued and submitted on merits by Messrs. Edwin J. Prindle, George W. Wickersham, and Eugene V. Myers, for plaintiff, and by Mr. Alex. Holtzoff, for defendant.

V. *Further proceedings in case*

On November 4, 1935, the court filed special findings of fact, and conclusion of law, deciding that plaintiff was entitled to recover, but reserved judgment pending the taking of testimony by a commissioner of the court upon the question of reasonable and entire compensation.

Opinion by Booth, Ch. J.

10 On January 13, 1936, the defendant filed a motion to amend the conclusion of law and for entry of an interlocutory judgment.

On January 24, 1936, the court allowed said motion and entered the following order:

ORDER

It is ordered by the court this 24th day of January 1936 that the defendant's motion to amend the conclusion of law and for entry

of interlocutory judgment in the above entitled case be allowed and the conclusion of law is amended to read as follows:

"Upon the foregoing special findings of fact which are made a part of the judgment herein, the court decides as a conclusion of law that the plaintiff's patent is valid and has been infringed by the United States and that he is entitled to compensation therefor under the act of June 25, 1910, 36 Stat. 851, as amended by the act of July 1, 1918, 40 Stat. 705, and Section 155 of the Judicial Code."

11 VI. *Special findings of fact, conclusion of law (as amended by the order of January 24, 1936), and opinion of the court by Booth, Ch. J.*

Messrs. Edwin J. Prindle, George W. Wickersham, and Eugene V. Myers for the plaintiff. Messrs. Arthur C. Fraser and R. Keith Kane, and Cadwalader, Wickersham & Taft were on the briefs.

Mr. Alexander Holtzoff, with whom was Mr. Assistant Attorney General George C. Sweeney, for the defendant.

This case having been heard by the Court of Claims, the court, upon the report of a Commissioner and the evidence, makes the following

Special findings of fact

I

The plaintiff, Robert Esnault-Pelterie, resides at 43 Boulevard Lannes, Paris, France. He is a distinguished inventor and practitioner in the art of aviation, and has always been a citizen and subject of the French Republic.

Plaintiff is the sole owner of the claim herein made and the only person interested therein and has made no assignment or transfer of said claim or any part thereof or any interest therein.

During June 1917 and thereafter up until June 21, 1921, he was at no time in the United States.

Plaintiff is not and never has been in the employment or in the service of the Government of the United States, and has not in any way voluntarily aided or abetted or given encouragement to rebellion against the Government of the United States.

II

The French Republic is a Government which accords to citizens of the United States the right to prosecute claims against such Government in its courts.

III

The plaintiff, Robert Esnault-Pelterie, made application in France for the following French patents:

French patent #372753, applied for December 19, 1906, issued February 28, 1907, and published April 18, 1907.

12 French patent #373763, applied for January 19, 1907, issued March 28, 1907, and published May 27, 1907.

French patent #373818, applied for January 22, 1907, issued March 28, 1907, and published May 28, 1907.

Copies of these patents, defendant's exhibits nos. D–7, D–8, and D–9 are, by reference, made a part of this finding.

IV

The plaintiff's French patent #372753 discloses an airplane having four wings, two of which are mounted forward of the longitudinal center of the machine and the remaining two rearward thereof, the wings being on the same general horizontal plane. Each of these wings is so constructed and mounted as to allow its angle of attack to be altered by rotating it about its longitudinal axis. The pilot's seat is located midway between the front and rear sets of wings. Equilibrium and directional control are obtained by means of two horizontally disposed levers mounted at the pilot's right and left hand, respectively. These levers are universally pivoted at their forward ends, their rear ends being adjacent to the seat of the pilot, and when in normal or neutral position the axes of these levers substantially coincide with the line or path of flight of the plane.

The longitudinal equilibrium of the machine is intended to be controlled by raising or lowering the rearward end of the right-hand lever, the directional response of the machine being of such a nature that when it is desired to nose the machine upward the rear end of the right-hand lever is raised, thereby causing the lever to assume a downward inclination from its end in the hand of the pilot to its point of universal pivotal support. When it is desired to nose the machine downward the operative end of the lever is depressed, thereby causing the lever to assume an opposite or upward inclination. The plane thus assumes an inclination opposite in directional response to the inclination impressed upon the normally horizontal control lever by the pilot or longitudinal equilibrium control.

Transverse equilibrium or rolling is controlled by manipulating the same right-hand lever in a horizontal plane to the right or left. The connections between this lever and the rear wing of the plane are such as to cause the plane to roll to the right when the lever is pushed to the right in a horizontal plane, and vice versa, the plane rolling in the direction in which the rear end of the lever is horizontally moved. An oblique movement of this lever will cause a control of both the longitudinal and transverse equilibrium in a relative degree of combination.

The left-hand lever is so connected with the directional rudder of the plane as to manipulate the same by swinging it in a horizontal plane either to the right or left, the result in directional response not being set forth in the French patent.

The left-hand lever is universally mounted at its forward end and a portion of the same extends beyond the mounting and engages in a slotted cross member connected to the forward end of the right-hand lever. This engagement with the slot functions as a fulcrum for the lever connections when transmitting any vertical component of movement of the right-hand lever to the rear wings.

13 This French patent also discloses means for varying the angle of attack of the front and rear sets of wings in the same degree so as to effect an increase or decrease of elevation without disturbing the longitudinal equilibrium of the machine, the necessity of nosing upward to ascend or downward to descend being eliminated. This is intended to be accomplished by an upward or downward movement of the rear end of the left-hand lever. An upward movement causes a downward inclination of the lever, in turn causing a descent of the plane, and vice versa.

When the left-hand lever is thus manipulated, the forward extension of the right-hand lever serves as a fulcrum point. As the forward ends of both the right and left-hand levers must operate as fulcrum points during certain control manipulations and the levers are thus interconnected, it is essential that the pilot must continuously keep hold of both levers.

There is no evidence that an actual airplane has ever been constructed in accordance with the disclosure of this patent. A model, defendant's exhibit 20, is illustrative of the controlling levers and their connections.

V

The Esnault-Pelterie French patent #373763 discloses an airplane structure subsequently referred to in these findings as of the ring-tail type. This structure is of the monoplane type having deformable wings and vertical and horizontal rudders mounted on a ring at the rear of the fuselage. A left-hand vertical lever gives control for steering the airplane to the right or left, and a right-hand vertical lever universally mounted and movable in all directions controls the pitching and transverse attitude of the airplane.

French patent #373818 is directed to an airplane structure subsequently referred to in these findings as of the bird-tail type. This patent discloses an airplane having deformable wings and a single rear tail surface adapted to support a portion of the weight of the airplane and movable around a longitudinal axis for steering and about a cross axis to cause the airplane to ascend or descend. The steering of the airplane is accomplished by the movement of a vertical left-hand lever, and a right-hand vertical universally mounted lever controls the pitching and transverse attitude of the airplane.

In both of these patents the directional response of the airplane to movements of the right-hand lever or stick is instinctive in direc-

tional character, in that the airplane tilts or inclines in the same direction that the control lever is tilted or inclined.

The disclosures in these two French patents form the basis of the patent in suit.

VI

(a) An airplane using a single vertical lever for the control of both longitudinal and transverse equilibrium, as disclosed in plaintiff's French patents #373763 and #373818, was constructed and flown by the plaintiff in the spring of 1907; numerous successful flights were made. This machine is now a part of a collection in the Conservatoire des Arts de Metiers in Paris.

This machine as constructed follows substantially the embodiment disclosed in French patent #373818. It differed therefrom
14 in that the control rod that connected the right-hand lever to the tail surface was replaced by a cable, an arrangement of yieldable rubber cords being provided between an upper horn on the tail surfaces and a fixed point in the fuselage in order to keep the cable under tension at all times, and thus permit a two-way control effect of the cable at all times.

(b) An article in the publication entitled "Aeronautics", published January 1909, described to the public the controls of the Esnault-Pelterie plane "R. E. P. II-Bis", using in part the following phraseology:

"Left-hand lever, with ball-and-socket joint, stabilizes in every sense by lowering exactly that side of the machine towards which it is pushed. This lever can be moved towards any point of the compass, thus working the horizontal rudder and twisting the wings at the same time to a corresponding degree, or only one performing function. Pushing it ahead sets the horizontal rudder to raise the rear end, pushing it astern to depress the latter. Pushing it to the right gives the right wing, pushing it to the left the left wing at decreased angle of flight, with corresponding increase of the opposite wing's angle. This is certainly the most perfect system thus far of handling controls. It makes flying easy, and brings about a natural reflex action without any thinking being needed, the idea taking at once possession of the mind that any dangerous inclination is immediately remedied by a simple movement of the 'magic wand' in the left hand towards that side, of an amplitude corresponding to the violence of the disturbance. This system is also beneficial in entirely separating the steering process from the stabilizing process as far as mental action goes. Although stabilizing by twisting will necessitate, like in the Wright machine, a corresponding steering movement, the latter, to the mind, will always appear as a part from the stabilizing effort and eliminate confusion."

A photostat copy of this article, plaintiff's exhibit 49, is by reference made a part of this finding.

VII

On December 10, 1907, at Paris, France, plaintiff signed and took oath to an application for United States patent which was forwarded with four sheets of drawings by plaintiff's patent attorney in Paris to his New York attorneys. This application included substantially all of the drawings of plaintiff's three French patents no. 373763, no. 373818, and no. 372753, and the specifications included the substance of the specifications of these three French patents. The oath referred to the same three French patents by dates of filing and numbers. To cover the inventions claimed in all three French patents in one patent in the United States, the United States application should have been filed within 12 months from the filing of the first French application, namely, on December 19, 1907; but the papers reached this country too late for filing within the statutory time limit.

On January 7, 1908, the plaintiff executed at Paris the application for United States patent, which matured into the patent in suit. The oath omitted reference to the French patent applied for December 19, 1906, no. 372753; and the specifications omitted that portion of the description contained in the application first signed, which corresponded to the 1906 French application. The attorneys then filed in the Patent Office on January 16, 1908, the new application papers and the drawings previously received.

The first sheet of the drawings then filed illustrated the construction of plaintiff's French patent of 1906, no. 372753, being identical therewith except that three small views of this French patent were omitted. The second and third sheets of drawings corresponded to the drawings of the plaintiff's second French patent, no. 373763, and his third French patent, no. 373818, respectively. The specification contained no description of the figures of the first sheet of drawings, the description referring only to the figures of the remaining three sheets of the drawings. The fourth sheet of the drawings correspond to the drawings of a certificate of addition of one of the French patents, dated May 4, 1907, and has no materiality herein.

The specifications which formed a part of the application indicated the construction and special features of the airplane both by verbal description and by reference made to the variously numbered drawings accompanying it. Among others were references to such drawings diagrammatically showing the device and operation of the entire control system of the longitudinal and lateral stabilities, and the horizontal direction in substantially the same manner as such control system appears in the patent as granted.

VIII

The claims as filed were as follows:

"1. An aeroplane in which the pairs of distortable wings are each subtended by two stay wires, a front one and a back one, leading from the outer corner to a longitudinal bar fixed at the lower part of a pivoted vertical rod projecting downward under the girder,

which rod, when rotated causes the traction of the front stay wire of one wing and the traction of the back stay wire of the other for controlling the inclination of the fore part of the former and that of the aft part of the latter for obtaining the transverse stability through deformation of the whole system.

"2. An aeroplane in which both directing and ascensional depending rudders are formed of one or two vertical planes pivoted about a vertical axis and of one or two horizontal planes pivoted about an horizontal axis, for producing, the direction and the longitudinal stability as well as the ascent and descent of the machine, the said rudder being capable of cooperating simultaneously with the distortable wings for obtaining the stability of the whole aeroplane.

"3. An aeroplane in which the directing and ascensional rudders are mounted on a ring with ball and socket joint capable of being pivoted about ideal horizontal and vertical axis.

"4. An aeroplane in which the controlling is effected by two separate levers, rigid transmissions for controlling the distortable wings and both rudders.

"5. An aeroplane comprising a screw at the fore end, a single pair of distortable wings and a tail or rudder formed of an horizontal plan with double rotation which may be used both for giving the direction to the machine and for obtaining the longitudinal stability and ascent or descent, the fore pair of distortable wings being used, on the other hand, to resolve the transverse stability.

16 "6. An aeroplane in which the controlling methods of the rear tail forming the rudder is carried into effect by means of two levers symmetrically arranged with reference to the pilot seat, the left-hand lever, for example, causing through a cardan system, the rotation of the rudder about a longitudinal horizontal axis, and the moving of the right-hand lever causing the inclination thereof about a transverse horizontal axis.

"7. An aeroplane with two pairs of distortable wings capable of pivoting about horizontal axis, the distorting of the wings having the effect of allowing of the transverse stability and the transverse inclination of the rear pair of wings to be performed, and of causing the direction of the machine and to set in the desired direction the fore and aft pairs of wings used for resolving the longitudinal stability and the ascent and descent of the machine.

"8. An aeroplane having a very light and sufficiently rigid transverse beam for aeroplane wings, consisting of a number of wooden members suitably cut out and leaving between them spaces for passing the ribs therethrough, and united together by upper and lower flanges riveted thereon and extended on the whole length of the girder, such girder being again characterized by the fact that at the point where the curve is changing the wooden members are replaced by metal members, for example of aluminum, suitably cut out and also riveted to the flanges."

The specifications and the drawings to which they made reference disclosed vertical levers for steering and for equilibrium control

which operated exactly as those described in the patent in suit as granted. Original claim 4 was directed to separate levers for controlling the distortable wings and both rudders, and claim 6 specified in effect that the left-hand lever was for steering and the right-hand lever was for longitudinal stability. The application as filed disclosed the vertical disposition and the instinctiveness of the direction of movement or inclination of the stabilizing or equilibrium control lever. The specification as filed did not make any reference to this lever effecting the movement of the control surfaces in an instinctive direction, nor did the specification as filed contain any claim directed to the novelty of such features.

The examiner of patents on March 10, 1908, made certain technical objections, cited five patents to show the state of the art, and required applicant to supply new drawings which should set forth the mechanism in detail showing its operative parts, certain figures of the original drawings being objected to as being only diagrammatic.

In response thereto, the plaintiff, on February 1, 1909, filed an amendment withdrawing the first sheet of drawings inasmuch as they applied to the 1906 French patent only, added new drawings containing Figs. 1a, 3a, 7a, 8a, and 9a as they appear in the issued patent, and rewrote the specifications. Plaintiff in this amendment made claim to the novelty presented by a single vertical lever for controlling transverse and longitudinal equilibrium, claims 2 and 13 being phrased as follows:

"2. An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder."

17 "13. An aeroplane having means for controlling its inclination and a single lever for operating said means to control both the longitudinal and the transverse stability of the apparatus; said lever being arranged to oscillate in different vertical planes, means for transmitting its movement in one plane to the means for governing the longitudinal inclination, and means for transmitting its movement in the other plane to the means for determining the transverse stability, said lever being mounted to permit also an oblique movement having components in each of said planes so as to actuate simultaneously the means for establishing longitudinal stability and that for establishing transverse stability."

The examiner of patents on March 2, 1909, rejected claim 13 for alleged lack of invention over the French patent to Laroze. To this the plaintiff made response asking for a reconsideration of the claim relative to the single control lever. The examiner, on May 10, 1910, and again on May 27, 1911, rejected the claim, this time on the basis of the Davidson as well as the Laroze patent. On May 23, 1912, the plaintiff cancelled this claim and required the insertion of figures 6 and 10 as they appear in the patent drawings, as substitutes for the originally filed figures 11 and 15. On June 12, 1913,

plaintiff filed a new set of claims among which were four appearing exactly as in claims numbered 5, 6, 7, and 8 of the patent in suit.

These were rejected by the examiner June 16, 1913, on the basis of the Davidson, Laroze, Montgomery, and Wright patents. By amendment of June 13, 1914, plaintiff added a claim which appears as claim 9 in the patent in suit.

On June 16, 1914, the claims were allowed and on November 3, 1914, the patent issued. A certified copy of the file wrapper and contents appear in evidence as defendant's exhibit D–1 and is made a part hereof by reference.

No supplemental oath was furnished by the applicant or required by the Patent Office.

IX

On November 3, 1914, Letters Patent No. 1115795 was granted to the plaintiff for an airplane, which patent is hereinafter referred to as the "patent in suit." A copy of this patent which is in evidence as plaintiff's exhibit 1 is by reference made a part of this finding.

The plaintiff's contentions on which this suit for infringement is based are limited to claims 2 and 5 to 9, inclusive, of the patent in suit, which claims are as follows:

"2. An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder.

"5. In an areoplane, the combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability.

"6. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, means for steering in a horizontal plane, a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability, and separate means for operating said steering means.

"7. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability, said single lever being operable by reflex movements of the body of an aviator to restore said areoplane to an even keel when it departs therefrom in either a lateral or longitudinal direction.

"8. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever movable in every direction operating upon both

said means for producing lateral stability and said means for producing longitudinal stability, said lever, upon forward movement thereof, operating said means for producing longitudinal stability to direct the aeroplane downwardly, said lever, upon rearward movement thereof, operating said means for producing longitudinal stability to elevate the aeroplane, said lever, upon movement thereof to the right and left, operating said means for producing lateral stability to raise the aeroplane on the left and right respectively.

"9. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability and a single vertical lever for operating both said means for producing lateral stability and said means for producing longitudinal stability, said lever being mounted upon an universal joint and being oscillatable in every direction."

X

An airplane supports itself by the reaction of its wing surfaces against the air through which it travels. This reaction is obtained by the relative movement of the plane with respect to the air, either by force of gravity as when the plane is in a glide or by the use of a propeller and motor as when the plane is in normal flight.

Piloting of an airplane involves two classes of control, to wit, directional control and equilibrium or stability control.

The directional control or horizontal steering is effected by the use of a vertical control surface located generally in the rear of the machine. Its action and function correspond to that of an ordinary rudder by means of which a boat is steered and this control surface is manipulated by the pilot to give proper directional flight to the plane and to correct any yawing of the plane that may occur.

The directional control or rudder control for steering the airplane in a horizontal plane as in directing the course of a ship is not, except in extraordinary circumstances, a critical control. When the airplane is in normal flight, it is immaterial whether the machine flies toward one point of the compass or another so far as its safety is concerned.

Two kinds of equilibrium or attitude control must be exercised, one being that which controls the lateral equilibrium or attitude of the plane and which has to do with the rolling of the machine around its longitudinal axis. The other is that of longitudinal
19 equilibrium or attitude which has to do with the inclination of the longitudinal axis of the plane either downward as in the case when it is descending or upward as when it is ascending.

Longitudinal equilibrium is effected by the use of a control surface or horizontal rudder called an elevator and located generally at the rear of the machine. By varying the angle of attack of this surface the inclination of the airplane is varied and if this elevator surface is so inclined that the rear or tail of the airplane is thrust upwardly, the machine assumes a descending attitude, and vice versa.

Lateral equilibrium is effected by a differential variance in the angle of attack of the wing surfaces or a portion thereof so that there is a resultant decreased lift on the surface or the portion thereof, of one wing with a corresponding increased upward lift on the opposite wing, the result being to cause the plane to roll about its longitudinal axis. Due to unequal air currents, air pockets, etc., lateral instability frequently occurs and the use of this rolling movement is necessary to regain such temporarily lost stability. This rolling movement or banking movement is also of importance when it is desired to turn the machine to the right or left in a horizontal plane by means of rudder or directional control and the turn is sufficiently sharp to bring centrifugal force into play with a consequent skid or side-slip of the plane which causes a dangerous loss of flying speed. This centrifugal force may be offset by rolling or banking the plane by means of the lateral equilibrium control.

When an airplane is rolled or banked the differential drag of the wings will cause the airplane to yaw or deviate from its directional course. The degree of yaw will be dependent upon the extent or angle of roll and also upon the character of structure employed for altering the wing surfaces.

Tests made upon a Waco biplane, a standard light airplane, utilizing ailerons for lateral equilibrium control indicated a three-degree yaw for a fifteen to twenty-degree roll from horizontal.

The cross currents and air pockets in the air are invisible to the pilot and therefore cannot be anticipated. These cause the airplane to be thrown into abnormal attitudes which must be properly and instantly corrected and thereby demands from the pilot a constant ability of instant control to restore the plane to proper equilibrium or attitude and at the same time control its directional movement.

In the flight of an airplane it most frequently occurs that both the longitudinal and lateral equilibriums are simultaneously disturbed, such disturbances commonly involving varying components of both equilibriums, and to compensate directly for such disturbances it is necessary that the airplane shall be tilted in an oblique vertical plane lying between the longitudinal and transverse planes of equilibrium or attitude control. Because the air disturbances through which the airplane passes act at random and at all possible angles, such oblique correction is required in the majority of instances of equilibrium or attitude control.

XI

An airplane may be constructed with a certain amount of transverse and lateral stability inherent in its structure. By constructing the wings with a dihedral angle, a lateral stabilizing tendency is given to the plane, and by providing a horizontal vane or tail surface a longitudinal stabilizing tendency is

imparted to the plane. By virtue of these lateral and longitudinal stabilizing tendencies, a plane in normal flight, when its attitude is disturbed by a gust of air, will of itself tend to regain its normal attitude without any manipulation of the controls by the pilot.

The banking and elevational controls of the plane by means of which the plane may be rolled or banked and nosed up or down, have a superimposed stabilizing tendency upon the plane and are used by the pilot for this purpose: that is to say, if the attitude of a plane in normal flight is disturbed by a gust of wind, the pilot may manipulate these controls and cause them to function in such manner as to stabilize or return the plane as soon as possible to a normal flight attitude, thus superimposing upon whatever inherent stability the plane has, an added stabilizing or equilibrium effect. The banking and elevational controls function respectively as lateral and longitudinal equilibrium controls, sometimes to assist and at other times to oppose whatever inherent stability or equilibrium has been built into the airplane.

XII

Man instinctively attempts to maintain his balance at all times, and if he is moved off balance in any direction he naturally and instinctively effects an opposite mental and muscular response which tends to restore his body to a normal vertical position.

If this natural directional reflex response is utilized in controlling the equilibrium of an airplane in normal flight, a material amount of conscious mental effort on the part of the pilot is eliminated.

An equilibrium control comprising a vertical lever universally mounted at its lower end so as to be capable of movement or inclination in any direction, and which when thus inclined in any vertical plane causes a corresponding movement of the whole airplane, tends to eliminate a material part of the conscious mental effort of the pilot with respect to equilibrium control during normal flight.

This result is due to the obvious relation between the control movement and the resultant effect upon the airplane, so that the pilot knows that any inclination imparted to the control lever in any direction will be followed by a similar directional inclination of the airplane, thus imposing a minimum of conscious mental effort upon the pilot and contributing to an instinctiveness of control of the airplane.

When an airplane assumes certain abnormal attitudes, such as its attitude in a spinning nose dive, the pilot cannot depend solely upon the obvious manipulation of such a lever in accordance with his instinctive or reflex action.

During blind flying (in fog or through clouds) when the pilot has no reference mark such as the horizon, the pilot cannot trust to his balancing instinct to control the airplane but must fly it by means of instruments designed to guide him under these conditions.

Blind flying, which is avoided by the usual pilot if possible, was unheard of at the date of the invention in suit and even today only represents such a small percentage of airplane operation as to be classed abnormal flying.

21 Captain Hegenberger, who has been investigating blind flying for the Government and instructing other pilots in blind flying, has only flown blind 200 hours out of a total of 2,500 flying hours and of the 200 hours 175 hours were flown deliberately or with the intention of investigating blind flying.

A pilot must undergo special training in order to undertake blind flying.

XIII

The patent in suit indicates as its object the construction of an airplane of the monoplane type with one or several pairs of wings which may be deflected or distorted as desired, and provided with rudders or with a tail, the combination of such means having the effect of providing for the control of longitudinal and transverse stability as well as for the desired direction in the ascent and descent of the machine.

Two principal embodiments or modifications are disclosed. The first of these has the steering rudder and the ascensional rudder mounted on an integral ringlike structure at the rear of the plane in such a way that the steering or vertical rudder may be rotated about a vertical axis while the ascentional rudder may be rotated about a transverse horizontal axis. The vertical directional rudder is arranged to be controlled by a vertical lever so placed as to be conveniently grasped by the left hand of the pilot, and the connections of this lever with the directional rudder are such as to steer the airplane to the right when the lever is pushed forward by the pilot and to steer the airplane to the left when the lever is pulled back by the pilot. The general details of this control structure are shown in figure 6 of the patent. Figures 3–a and 1–a are illustrative of this embodiment in its entirety, and figures 16, 17, 18, and 19 are illustrative of some of the details of the mounting of the ascensional and directional rudders.

Battey figure A, plaintiff's exhibit 5, which is by reference made a part of this finding, is illustrative of this embodiment.

The second embodiment or modification is that of an airplane having a single rudder or tail surface which is capable of pivoting about a horizontal longitudinal axis and also about a transverse horizontal axis, this rudder or tail surface possessing the dual functions of both directional and ascensional control. This tail surface is cambered with the concave surface down to function as a lifting surface and normally supports a portion of the load of the plane. As shown in figure 10, this rudder or tail is rotated about the longitudinal axis of the plane to give directional control and this movement of the tail is obtained by means of a vertical lever mounted to be grasped by the

left hand of the pilot. A transverse movement of this lever to the left will incline the rudder surfaces or tail so as to steer the plane to the left. A movement of this lever to the right will steer the plane to the right.

The details of the controls of this embodiment are shown in figure 10, and the plane is shown in figures 7, 8, 7–a, and 8–a. This embodiment is also illustrated by the physical model, defendant's exhibit 22, when arranged with the downwardly projecting horn or rudder post.

22 As disclosed in figure 8–a of the patent drawings, the steering lever is arranged in contiguity to a toothed rack for locking or holding this lever in any desired position, such structure enabling the pilot to free his left hand for other purposes.

In both embodiments the means for controlling the equilibrium comprises a vertical lever adapted to be grasped by the right hand of the pilot. This lever is universally supported or mounted at its lower end as shown in figures 6 and 10 so that the upper end is free to swing either to the right or left or forwardly or backwardly and also to any oblique or intermediate inclination. Through a series of lever arms this control lever is connected to wires which are in turn connected with the wing surfaces in such a manner that a movement of the lever to the right causes a variation in the angle of attack of a portion of the wing surfaces with the result that the machine will roll to the right and if the lever is moved to the left the machine will roll to the left. This lever is also connected with the ascensional or elevator control surfaces at the rear of the plane, which surfaces control the longitudinal equilibrium of the machine. The forward movement of this control lever will cause these surfaces to assume such an inclination as to cause the machine to nose down while the rearward movement of this lever will cause an opposite inclination and nosing up of the machine. If the equilibrium control lever is moved to an inclined position intermediate to positions which it would occupy if moved either in a fore and aft or in a transverse direction, it exerts simultaneously such a controlling action upon both the means for controlling the transverse and the longitudinal equilibrium that the airplane responds with a corresponding directional inclination.

Figure 7–a discloses an upwardly projecting horn or rudder post 82 connected with the equilibrium control lever 86 by means of a control wire or very thin rod 83. This structure is contrary in directional control to figure 10, showing in detail the connections between lever 86 and the rudder, and original figure 15, also showing the control connections, which figure was canceled prior to issuance of the application which matured into the patent in suit.

The connections shown in figure 7–a are also contrary in directional effect to the subject matter defined by claims 7 and 8.

Inter partes tests made at Amityville, N. Y., on July 16, 1931, with a full-sized airplane equipped with a ringtail structure built in accordance with the teachings of the patent in suit, demonstrated that

the disclosures and description contained in the patent in suit are of sufficient fullness to enable one skilled in the art to practice the invention disclosed by the patent in suit, and defined by the phraseology of the claims in suit.

XIV

The second embodiment illustrated and described in the patent in suit possesses but a single controlling surface for both directional and ascensional control. When this surface is rotated about the longitudinal axis of the airplane by the left-hand lever to give directional or steering control, its lifting effect is also varied, thus resulting in a variation of the pitch of the airplane. Conversely, when the right-hand lever of the airplane is operated in this
23 modification, in order to vary the pitch of the airplane, a variation of the steering effect of this surface will be introduced unless this surface is in a neutral or horizontal position. These effects are known as "cross-responses." The presence of such cross-response in this second modification, illustrated and described in the patent in suit, does not impair the operativeness of either of the right or left-hand levers and each lever performs its function regardless of the position of the other lever.

Irrespective of the cross-responses, the pilot may use the left-hand lever to steer the airplane to the right or left and use the right-hand lever to effect a change in either the pitch or transverse attitude of the airplane.

XV

In the first modification described and illustrated in the patent in suit, the steering and pitching surfaces are mounted on a ring member having a ball and socket mounting. As illustrated in figures in the patent in suit, the ball and socket mounting gives to this ring member a limited side swing of about 7 degrees to each side of the vertical.

Side swing of the ring member is also restrained by the fork and pin connections between the control rods, and the ring and the control rods and the actuating levers.

Defendant's physical exhibit 21 is a model illustrative of this modification with the exception that it departs from the disclosure of the patent in suit by providing swivel connections in the control rods, thus eliminating the above-mentioned restraint of side swing.

Such side swing has no utility or purpose, and the specification on page 1, line 27, says with reference to this construction that:

"The steering rudder is vertical and may be rotated about a vertical axis, while the rudder which steers the aeroplane upward or downward (called for convenience the 'ascensional' rudder) and which is horizontal and is integral with the vertical rudder, may be rotated about a transverse horizontal axis in such a way as to secure the longitudinal stability of the machine and allow of the ascent and descent to be effected."

To incorporate a guide in the structure of the airplane to maintain the axis of the steering rudder vertical and the ascensional rudder horizontal as set forth in the specification, as quoted above, is within the province of the skilled mechanic. One form of guide to accomplish this is illustrated by plaintiff's physical exhibit 50, as applied to defendant's exhibit 21.

Without this guide in place a certain amount of cross response is present in the second modification due to the side swing of the ring. Such cross response does not impair the operativeness of either the right or left-hand control levers and each lever performs its function regardless of the position of the other lever. Irrespective of the cross responses, the pilot may use the left-hand lever to steer the airplane to the right or left and use the right-hand lever to effect a change in either the pitch or transverse attitude of the airplane.

With the guide in place and the axis of the steering rudders and ascensional rudders, respectively, maintained in the vertical and horizontal, the amount of cross response is negligible.

24 XVI

On September 23, 1931, the defendant's experts conducted a series of tests in the full-sized wind tunnel maintained by the National Advisory Committee for Aeronautics at Langley Field, Virginia. Plaintiff's counsel and experts and a commissioner of the United States Court of Claims were present at these tests.

There were three series of tests made on a Chance-Vought Corsair airplane to which a modified tail structure had been applied. The three series of tests were as follows:

(a) Tests of the Corsair airplane with a tail structure substantially embodying the bird-tail modification of the patent in suit.

(b) Tests of the Corsair airplane with a substantial embodiment of the ring-tail structure of the patent in suit with the exception that the connections of the control rods to the ring on which the rudders were mounted were of such a nature as to permit free side swing of the ring.

(c) Tests of the Corsair airplane with the ring-tail structure guided so as not to permit a side swing.

These tests qualitatively demonstrated the presence of cross responses in the bird-tail embodiment, as set forth in finding XIV, and in the embodiment of the ring-tail structure with the ring free to swing as set forth in finding XV. They also demonstrated the fact that the cross responses were negligible when the ring-tail structure was restrained to a side swing as set forth in finding XV.

In all of the tests the speed of air through the wind tunnel was approximately 57 miles per hour, while the speed of the airplane motor was 1,550 r. p. m., which would normally drive the airplane in free horizontal flight at a speed of 110 miles per hour. This difference in speed caused the development of a slip stream from the propeller with a high degree of turbulence and spiral distortion,

which caused the controlling surfaces to be subjected to abnormal conditions not present in free flight and thus rendered the tests ineffectual for a quantitative determination of cross responses.

With the exception of neutral position, the tests were made only with extreme displacements of the control levers such as would occur only in landing an airplane or in acrobatic flight. No tests were made to demonstrate the reactions or to measure the reactions the controlling surfaces would be subjected to in normal-flight operation of the airplane.

XVII

On July 16, 1931, plaintiff caused flights to be made with an Aeronca airplane at Amityville, Long Island, N. Y., in the presence of defendant's experts and counsel and the commissioner. The Aeronca airplane had been modified by removing its conventional tail structure and substituting a tail structure of the ring-tail type as disclosed in the patent in suit.

This ring-tail structure was so designed as to be flown either with a guide in place to hold the axes of the vertical and horizontal rudders in vertical and horizontal planes, respectively, or with the ring-tail structure unrestrained to the extent that it had a total side swing of 28 degrees.

25 Flights were made with the ring-tail structure both restrained with the guide and unrestrained. The flights involved taking off and landing and executing banked right and left-hand turns. Such flights demonstrated the operativeness of the ring-tail structure disclosed in the patent, both with the ring-tail restrained and unrestrained, and in each of the flights the pilot used the "joy stick" to operate the equilibrium controls and used the rudder for steering. In all flights the steering and stabilizing levers were mechanically separate and independent and each lever performed its own function regardless of the manipulation of the other lever.

The details of the ring-tail construction are shown in blueprint, plaintiff's exhibit 66, and the Aeronca airplane with the ring-tail construction in place, is shown in the photographs, plaintiff's exhibits 61 to 65, inclusive. These exhibits are by reference made a part of this finding.

XVIII

Minor cross responses are present in all airplane controls. In any conventional airplane if the "joy stick" is so moved as to roll the machine to the left, the machine not only rolls but actually starts to turn to the left. Similarly, if the rudder of a conventional airplane is manipulated so as to cause a turn, the machine will immediately bank or roll.

Any change in speed of the plane varies the effective air pressure upon the control surfaces as the square of the speed, therefore giving different rudder and aileron effects for different speeds of the air-

plane. Many conventional single-motor airplanes are so rugged as to maintain a level position at cruising speed. If the speed is varied, the effect of the slip stream of the propeller becomes different and the plane will have a tendency to roll one way or the other, depending upon whether the engine's speed has been increased or decreased. Such roll may be corrected by proper manipulation of the joy stick.

XIX

One airplane at least of the construction illustrated and described as a Curtiss "JN–4D" was manufactured for and used by the defendant without license or permission from the plaintiff and such manufacture and use occurred within the United States between June 1917 and November 11, 1918.

One airplane at least of the construction illustrated and described as a De Haviland "DH–4B" was manufactured for and used by the defendant without license or permission from the plaintiff and such manufacture and use occurred within the United States after November 11, 1918.

One airplane at least of the construction illustrated and described as a Loening monoplane "M–81" was manufactured for and used by the defendant without license or permission from the plaintiff and such manufacture and use occurred within the United States after November 11, 1918.

XX

No action has been had upon plaintiff's claim for alleged infringement resulting from the construction or use of the above air-
26 planes except that the plaintiff presented his claim to the Secretary of War, who declined to allow it. This claim was presented by a letter dated November 29, 1920, addressed to James J. Mayes, colonel, judge advocate, United States Army, located in Paris, who was then chief requisition officer, R. R. & C. Service.

In this letter plaintiff recited his three French patents, including his prior 1906 patent and his United States patent, alleged infringement on the part of the United States, and asked that arrangements be made for indemnification for his damage. To this letter Colonel Mayes made reply advising that he had transmitted the documents to The Adjutant General of the Army at Washington, D. C. The plaintiff has never brought or has pending in any court any suit or process against any other person, firm, corporation acting or professing to act mediately or immediately under the authority of the United States for or in respect of the said claim.

Neither the plaintiff nor his agent has ever made or sold in the United States the articles described in and covered by the patent in suit.

XXI

The control systems of the Curtiss, De Haviland, and Loening airplanes set forth in finding XIX are shown, respectively, in blue

prints which are plaintiff's exhibit 2, plaintiff's exhibit 3, and plaintiff's exhibit 4, and are by reference made a portion of this finding.

In the Curtiss "JN–4D" the controlling mechanism for the directional rudder comprises a centrally pivoted horizontal rudder bar or lever situated directly in front of the pilot and in position for actuation by the pilot's feet. This structure is shown in plaintiff's exhibit 5, Battey figure D, which is by reference made a part of this finding. The ends of the rudder bar are connected by cables to the directional rudder in such a manner that when the pilot actuates the same with his foot against the right end of the lever the airplane is directed toward the right, a push on the left end of the lever resulting in an opposite directional movement.

The means for controlling the transverse and longitudinal equilibrium or pitch and roll of the airplane comprises a vertical lever, known as the "joy stick", universally mounted at its lower end in position in front of the pilot so that its upper end may be conveniently grasped with either hand. This is shown in plaintiff's exhibit 5, Battey figure C, which is by reference made a part of this finding. The universal action of this lever is had by mounting the same on a shaft so that it is free to be swung to the right or left, the lever also being pivoted to the shaft so that it is free to rock in a fore-and-aft direction. This mounting gives the lever a universal movement. Through an arrangement of pulleys and cables the effect of the movement of the lever to the right causes a variance in the angle of attack of a hinged portion of the winged surfaces so that the right wing as a whole drops and the left wing rises, the machine therefore rolling to the right. A corresponding movement of the lever to the left causes a reverse movement of the hinged portion of the two winged surfaces known as ailerons so that the machine rolls to the left.

The "joy stick" or vertical lever is connected with the horizontal control surfaces at the rear or tail of the airplane, which
27 controls its longitudinal equilibrium in such a manner that when this lever is pushed forward the control surfaces are so manipulated as to cause a downward movement of the rear edge of the elevator surface, which in turn results in the downward inclination of the machine. A movement of the lever to the rear produces an opposite effect on the elevator surface, causing the machine to nose up or to assume an upward inclination. When the "joy stick", or equilibrium control lever, is moved in any intermediate position, a consequent movement of the airplane will be produced corresponding relatively to the degree of inclination and the direction of movement of the lever.

The direction and equilibrium controlling means and their connections to the controlling surfaces are illustrated in the model of the Curtiss "JN–4D", defendant's exhibit 23.

In the De Haviland "DH–4B" airplane the means for controlling the directional rudder is identical with that in the Curtiss airplane. The equilibrium control of the De Haviland airplane is illustrated in

plaintiff's exhibit 5, Battey figure F, which is by reference made a part of this finding. This structure is functionally the same as that of the Curtiss "JN–4D" and is also substantially similar in constructional details.

It comprises a single vertical control lever, or "joy stick", universally mounted at its lower end so as to swing forwardly and rearwardly and transversely, or in any intermediate vertical plane, the same being so connected with the controlling surfaces as to cause the machine to nose down when the lever is forwardly inclined, nose up when the lever is backwardly inclined, roll to the right when the lever is inclined to the right, roll to the left when inclined to the left, or to respond to any combination of these movements when the lever is placed in intermediate positions.

In the Loening monoplane "M–81" the action of the horizontal rudder bar or lever and the vertical equilibrium control lever and the resulting effect of their action upon the control of the machine is identical with that indicated in connection with the Curtiss and De Haviland airplanes. The Loening structure is illustrated in plaintiff's exhibit 5, Battey figures G and D, which are by reference made a portion of this finding.

XXII

Each of the three airplanes referred to in finding XIX has wings, a portion of which is hinged so that the contour of the wing surface may be altered and the angle of attack changed for the purpose of controlling the roll or transverse equilibrium of the airplane. The three airplanes also have a rudder pivoted on a horizontal axis for controlling the longitudinal equilibrium or pitch of the airplane.

The means for controlling the wing surfaces and the horizontally pivoted rudder, and thus controlling the lateral and longitudinal equilibrium of the three airplanes, comprise a vertical lever universally mounted at its lower end with the upper end movable in any direction. In normal flight the direction of angular inclination of the vertically mounted equilibrium control lever in the three airplanes, set forth in finding XIX, causes the airplane to tilt in the same direction, and the response of the airplane is thus in accord with the instinctive balancing sensations of the pilot.

28 The foot-actuated rudder bar functions as a separate lever for controlling the steering or vertical rudder. In each of the three airplanes set forth in finding XIX the universally mounted vertical lever is so connected with the controlling surface of the airplanes that when the lever is moved rearwardly the airplane is nosed up; when the lever is moved forwardly the airplane is nosed down; when the lever is moved to the right the airplane rolls to the right; when the lever is moved to the left the airplane rolls to the left.

The three airplanes referred to in finding XIX differ structurally from the specific embodiments illustrated in the patent in suit in

that they employ a horizontal foot-control lever for controlling the directional steering of the airplane in a horizontal plane, whereas in the illustrated embodiments of the patent in suit such means is disclosed as a vertical lever so positioned as to be manipulated by the pilot's left hand.

The mechanical connections between the levers and the control surfaces are also different in structural details from those shown in the embodiments illustrated and described in the patent in suit.

The equilibrium control lever or joy stick of the three airplanes has the same controlling functions as the equilibrium control lever of the patent in suit.

XXVIII

It has been stipulated between the parties that proof of any airplanes having been manufactured for or used by the defendant other than those airplanes set forth in finding XIX and of any damage alleged to have resulted to plaintiff might be deferred until after the adjudication has been had by the Court of Claims as to the validity of the patent in suit and as to infringement thereof by the airplanes set forth in finding XIX.

XXIV

Prior to the plaintiff's alleged date of invention covered by the patent in suit, the following patents and publications were available to the public:

French patent to Penaud and Gauchot, #111574, dated February 18, 1876.

British patent to Davidson, #13700, of 1898.

French patent to Macedo, #290488, dated July 3, 1899.

French patent to Laroze, #356842, dated June 30, 1905.

German patent to Schussler, #85326, date issued February 27, 1896.

German patent to Jung, #129146, date issued March 20, 1902.

United States patent to Wright, #821393, date issued May 22, 1906.

United States patent to Wadsworth, #213079, date issued March 11, 1879.

United States patent to Weeber, #704156, date issued July 8, 1902.

United States patent to Hartness, #168486, date issued October 5, 1875.

British patent to Quentin, #3872, of 1892.

British patent to Wilson, #20022, of 1889.

Publication entitled "Report on the Status of the Experiments with a Dragon Flier", published in Germany, January 1901, by W. Kress.

29 Publication entitled "How the Bird Flies and How Man Will Fly", published in Aviatik Vienna, 1905, by Wilhelm Kress.

Copies of these patents and publications, together with translations, have been introduced in evidence as defendant's exhibits nos. D–3,

D–4, D–12, D–5, D–6, D–7, D–27, D–28, D–112, D–113, D–114, D–115, D–121a, D–121b, D–122a, D–122b, and plaintiff's exhibit no. 50, respectively, and are by reference made a part of this finding.

XXV

The Penaud and Gauchot patent of 1876 discloses an airplane having a vertical rudder for controlling the direction or steering of the machine in a horizontal plane and a horizontal or ascensional rudder for controlling the longitudinal equilibrium. It does not disclose any adjustable means for controlling the lateral equilibrium or stability. In the structure disclosed in this patent the pilot manipulates the vertical and horizontal rudders through a control structure comprising a horizontal transverse bar mounted on a vertical column or rod in front of him and resembling the steering bar and steering column of a bicycle. The horizontal or ascensional rudder is manipulated by a pushing and pulling movement upon the bar and rod as an entirety, and the vertical rudder is controlled by a turning movement of the handlebar about the vertical axis passing through its middle. The patent discloses a directional response in a horizontal plane similar to that of a bicycle when the handlebar is turned, but the directional response present when the vertical column is pushed forward or pulled backward to manipulate the horizontal rudder is not indicated. The use of both hands would be required to operate these two controls. There is no evidence to show that a machine was ever constructed or operated in accordance with this disclosure.

The Penaud and Gauchot patent (1) does not disclose any mechanism by which the transverse equilibrium can be voluntarily controlled; (2) it discloses the controls of the longitudinal equilibrium and the horizontal steering united in a single device instead of being separate; (3) it requires that both hands must be necessarily employed to control either the longitudinal equilibrium or the horizontal steering; (4) it gives no indication to a man skilled in the art as to whether the response of the airplane from the manipulation of the horizontal rudder is in the same angular direction as the inclination of the vertical column controlling this rudder.

XXVI

The Davidson patent of 1898 cited by the Patent Office during the prosecution of the application which matured into the patent in suit, discloses an airplane having a controlling tail surface composed of three parts. The two side parts are movable on horizontal longitudinal axes, and the central part is pivoted to a horizontal transverse axis. The equilibrium control comprises a pendulum universally mounted at its upper end, and sufficiently weighted at its lower end to have the tendency to assume a constant vertical position. This pendulum is connected to two motors, one of which acts on the tail surface to control transverse equilibrium and the other

of which acts on the tail surfaces to control longitudinal equilibrium. If the plane rolls to the right or left or noses up or down, the inclination of the pendulum to the plane structure sets the corresponding motor or motors in operation so that the resulting action on the control surfaces will automatically restore the equilibrium of the plane.

There is no disclosure of any means or mechanism by which the pilot may manually control the stability of the plane and the mechanism shown would not suitably accomplish this object, as the automatic action of the pendulum is intended to respond solely to the force of gravity and does not take into account inertial and centrifugal force which would have important and disturbing effects were an attempt made to utilize this structure. There is no evidence that this mechanism as disclosed was ever employed in any airplane.

The controls in the Davidson patent differ from those claimed by the patent in suit in that (1) they are automatic instead of manual; (2) the controlling movements disclosed would be inoperative to obtain the required results due to the disturbing effects of inertial and centrifugal forces.

XXVII

The French patent to Macedo discloses a glider plane adapted to be raised in the air by means of a captive balloon, subsequently released and gliding to the location of the next captive balloon where it is again raised and the performance repeated. The plane disclosed has a horizontal or ascensional rudder for controlling the longitudinal stability or equilibrium which is controlled by a foot lever the top of which when pushed forward results in the raising of the rear end of the horizontal rudder, causing the machine to rise, and vice versa. The control of the transverse equilibrium and steering mechanism is accomplished by the movement of a single control lever which is vertically mounted so as to move freely in a fore-and-aft direction and which has mounted on it a transverse bar similar to the handlebar of a bicycle. To cause the machine to roll to the left the pilot pushes the vertical lever forward, and for a right roll pulls the vertical lever back. To steer the machine to the right the pilot turns the handlebar arrangement counterclockwise or opposite to the direction employed in steering a bicycle. In order to properly manipulate the transverse equilibrium and directional control, it is necessary for the pilot to grasp the handlebar with both hands.

There is no evidence that a machine was ever constructed in accordance with the disclosure of this patent.

The system of controls disclosed in the Macedo patent differs from that defined by the phraseology of the claims of the patent in suit in that: (1) the longitudinal equilibrium control is operated by a foot lever instead of a vertical lever adapted for operation by the hand of the pilot; (2) the movement of the longitudinal equilibrium

control is in the opposite angular sense from the response of the machine; (3) the transverse equilibrium control is united with the horizontal steering control, the movement of the hand-operated vertical lever being in a plane at right angles to the plane of the resulting response of the machine: (4) the lateral equilibrium control
31 and the steering control are connected and dependent, whereas in the invention as disclosed by the patent in suit they are separate and independent.

XXVIII

The Laroze patent of 1905, which was cited by the Patent Office during the prosecution of the application which materialized into the patent in suit, discloses an airplane provided with a vertical control column which can be swung in a fore-and-aft direction and which can also be rotated about its own vertical axis. On the top of this column there is mounted in a normally vertical transverse plane a control wheel. The connections between this control wheel and the means for controlling the longitudinal and transverse equilibrium of the machine and also the directional rudder are such that the various responses of the machine would occur upon the several possible movements as herein set forth, viz, the transverse equilibrium of the machine is controlled by swinging the wheel and thereby rotating the column on which the wheel is mounted about a vertical axis. The wheel is thus bodily swung about its vertical axis and with the pilot's hands at the right and left-hand side of the wheel, respectively, the controlling movement would be similar to that of turning the handlebar of a bicycle. The mechanical connections to the controlling surfaces are such that turning the wheel and column on which it is mounted clockwise in a horizontal plane causes the machine to roll to the left, and vice versa. The longitudinal equilibrium of the machine is controlled by pushing the wheel bodily forward or pulling it rearward. This causes the column to swing in a fore-and-aft plane, which motion is transmitted to the control surfaces upon which forwardly inclining the column and control wheel the machine would be caused to nose up, and vice versa.

The directional rudder for steering in a horizontal plane is controlled by turning the wheel about its own horizontal axis like the steering wheel of a ship. The connections between this control wheel and the directional rudder are so arranged that turning the wheel clockwise in a vertical plane causes the machine to turn counterclockwise in a horizontal plane, and vice versa. It is necessary at all times for the pilot to grasp the wheel with both hands in order to obtain the desired response. There is no evidence that a machine was ever constructed in accordance with the disclosure of this patent.

The controls in the Laroze patent differ from those defined by the phraseology of the claims in the patent in suit in that (1) the transverse equilibrium is controlled by swinging the wheel in a horizontal plane causing the response of the machine to occur in a vertical

transverse plane; (2) the longitudinal equilibrium is controlled by moving the wheel and column in an opposite sense to the angular direction of response of the machine; (3) the steering means is connected with and mounted upon the equilibrium controlling means.

XXIX

German patent to Schussler, no. 85326, was issued February 27, 1896. This patent which dates from a period prior to the operation of any power-driven airplane illustrates an aerial row-
32 boat construction in which the pilot is suspended in a cage under an umbrellalike wing. The cage or platform upon which the aviator sits is connected to the wing by means of a universal joint construction and the wing is provided with a rigid dependent steering rod which is intended to be grasped by the hands of the aviator, who sits in the suspended frame or cage. The device is intended to be propelled by two lateral projecting oars HH. These oars are manipulated by the feet of the aviator by means of foot pedals and are connected to the foot pedal in such a manner that when the aviator's feet are stretched out the oar surfaces will be vertical while when he draws his feet up they are horizontal in order to offer the least possible resistance. The dependent steering rod is intended to give the sail or supporting surface any desired inclination in relation to the frame for the purpose of giving to the sail " the proper position for the momentary direction of flight."

There is no satisfactory evidence that this device would operate in any other manner than a parachute, or that the aviator, by pushing or pulling on the dependent steering rod which is rigid with respect to the wing or supporting surface, would do more than shift his weight so as to change the position of the general center of gravity. There is no evidence that a machine was ever constructed or operated in accordance with this disclosure.

XXX

German patent to Jung, issued March 20, 1902, discloses an airplane apparently in the nature of a glider but intended to be propelled by the muscular action of the aviator who lies prone and operates a pair of triangular wings or oars by a kicking motion of his feet. The disclosure shows a structure with a nearly horizontal supporting wing having in front a movable elevator which can be tilted by the flier by means of a dependent swinging lever actuated by a cross bar at the lower end held in his hands. When pushed forward the rear end of the elevator will be raised and will tend to cause the machine to nose downward, and vice versa. No means is disclosed for steering in the horizontal plane or controlling the transverse equilibrium.

There is no evidence that a machine was ever constructed in accordance with this disclosure.

XXXI

The patent to Wright, no. 821393, issued May 22, 1906, discloses a transverse equilibrium control comprising a cradle located upon the lower wing of a biplane structure. The aviator or operator lies in a prone position on the wing and by moving his body to the right or left shifts the cradle. The movement of the cradle to the right alters the angle of attack of the wing surfaces in such a manner that the plane rolls to the right, and vice versa.

The cradle is also connected to the directional rudder at the rear of the plane so that the rudder is also manipulated and is swung to the side on which the edges of the wings present the least angle of resistance. Longitudinal equilibrium is maintained by means
33 of a horizontal rudder or vane located in front of the main surfaces. This surface is operated by means of a roller located in front of the pilot and adapted for manual operation.

XXXII

United States patent to Wadsworth, #213079, issued March 11, 1879, discloses a single vertical lever mounted on a universal joint and actuating one mechanism or engine by a motion in one plane and actuating a second mechanism or engine by a motion in another plane at right angles to the first plane. By an oblique or diagonal motion of the lever both mechanisms are capable of simultaneous actuation. The engines mentioned in the patent are the steering engine and the driving engine of a steam vessel or traction engine. Movement in one direction would control the propelling engine, and movement in the plane at right angles thereto would control the steering engine. No mention is made in the patent of its application to aviation or to equilibrium control of an airplane.

XXXIII

United States patent to Weeber, #704156, issued July 8, 1902, discloses a single universally mounted lever for controlling the steering and the braking devices for automobiles. The end of the lever is adjacent the driver's seat and when swung to the right or to the left, the lever actuates a shaft which steers the automobile to the right or to the left. By moving the lever fore or aft the braking mechanism is applied or disengaged. No mention is made of the use of this device in connection with the equilibrium controls of an airplane.

XXXIV

United States patent to Hartness, #168486, issued October 5, 1875, discloses a car or boat attachment for balloons. Its disclosure shows a suspended car for a dirigible balloon. At the rear of the car is mounted an integral elevational and steering rudder which is carried on a universal lever mounted on a universal or a cardan

joint. The lever projects horizontally forward of this joint. In order to operate the elevational rudder the forward end of the lever is moved up or down, and to operate the steering rudder it is moved from side to side. The direction of the response is contrary to the angular inclination of the horizontal lever. The patent does not disclose any lateral stabilizing means.

This patent was considered by the United States Patent Office during the prosecution of the Esnault-Pelterie application which matured into the patent in suit.

XXXV

British patent to Quentin, #3872, of 1892, discloses a flying machine having two superposed surfaces or planes which are alternately or oppositely reciprocated or flapped. The surfaces have blades or shutter which in the upward movement open and in the downward movement close, the surfaces thereby tending to lift or pull the machine into the air.

34 The car is suspended by stays or shrouds and a vertically mounted control lever capable of tilting or inclining in all directions is so connected to the stays or shrouds as to shift the center of gravity of the car with respect to the lifting planes or surfaces so as to cause their propulsive effect to act obliquely and to thus steer the car in a direction in which the lever is inclined. There are no means disclosed in the patent for producing or controlling longitudinal or lateral stability.

XXXVI

British patent to Wilson, #20022, of 1889, shows a horizontally mounted lever closing and opening electric circuits as it is swung up and down. The post on which the lever is mounted is self-arranged to turn on a vertical axis so that when the lever is moved horizontally a second set of electric circuits is opened and closed. This device is stated to be for the remote control of searchlights, guns, telescopes, and the like. The lever when displaced from a neutral position operates the electric contacts to set in motion electrical motors which cause a movement of the control device. When the control lever is brought back to its neutral position the controlled device remains stationary in the position to which it has been moved, and to return the controlled device to its original position the lever must be moved to the opposite side of its neutral position. There is no fixed relationship between any given position of the control lever and the position of the device controlled by it.

The Wilson patent contains no reference to aviation.

XXXVII

United States patent to Simpson, #909468, was issued January 12, 1909, on an application filed in the United States Patent Office Janu-

ary 14, 1907. A copy of this patent, defendant's exhibit D–148, is by reference made a part of this finding.

This patent discloses a hydroplane boat, the hull of which is formed of two parallel pontoons which float on the water and are lifted therefrom by three submerged dependent hydroplane surfaces one of which is located in front and two at the rear. These hydroplane surfaces are carried on lever arms pivoted to the hull. Cables are attached to the lever arms and lead to a drum located at the lower end of a vertical lever or column, the top of which is provided with a wheel. When the wheel is turned the cables are wound about or released from the drum. In order to simultaneously vary the angle of incidence of the three hydroplane surfaces, the pilot by turning the wheel controls the lifting effect of the hydroplane surfaces whenever the boat rises too high or falls too low. The vertical shaft rotates in a sleeve mounted in gimbal joints so that the shaft may be tilted in any direction by bodily moving the handwheel. The pilot by pushing the wheel forward and thus tilting the shaft increases the incidence of the front of the hydroplane and decreases the incidence of the rear of the hydroplane, thus causing the boat to incline upward at the bow. The tilting of the shaft to the right increases the incidence of the right hydroplane and decreases the incidence of the left hydroplane, thereby causing the boat to roll toward the left, and vice versa. The tilting of the shaft in any given direction causes the boat to rise on the side toward which the shaft is tilted, and the angular response thus described is contrary to the direction of angular response disclosed in the equilibrium controlling mechanism of the patent in suit and described in the claims.

XXXVIII

Certain French airplanes manufactured by Bleriot and Farman in France were brought to this country in 1910 and 1911, and were used in exhibition flights. Following these exhibitions some airplanes were built in this country embodying the control wings used on the French airplanes.

The control means included a single-stick control comprising a single vertical lever universally mounted for the longitudinal and lateral control of airplanes, the controls being responsive from such a direction that the tilt of the airplane followed the tilt of the control stick.

There is no satisfactory evidence that any of these said airplanes were in existence in the United States at any time while the Esnault-Pelterie application, which matured into the patent in suit, did not contain either claim 12 or 13 introduced February 1, 1909, and canceled on May 23, 1912, or the later substituted claims filed on June 12, 1913, which substituted claims subsequently became claims 5 to 9, inclusive, of the patent in suit.

XXXIX

Two types of control were in public use on airplanes in the United States in 1912. They were the Wright and Curtiss and are illustrated in plaintiff's exhibits 14 and 15 which are by reference made a part of this finding.

The Wright controls consisted of two vertical levers mounted adjacent the pilot's seat and adapted to be grasped at their top ends by his right and left hand, respectively. The right-hand lever was mounted to swing fore and aft in the direction of flight and carried at its top a small tilting lever mounted to swing transversely to the right and left. The pilot by grasping the small tilting lever and swinging it to the right caused the airplane to steer horizontally to the right, and vice versa. Moving the right-hand lever forward caused the machine to roll to the left and inversely.

The left-hand vertical lever controlled the elevation and depression of the machine. When pushed forward the machine was caused to nose downward, and vice versa.

In the Curtiss machine lateral stability or equilibrium was controlled by means of a shoulder yoke mounted on the back of the pilot's seat and strapped to the pilot's body. If the pilot leaned to the right the machine rolled to the right and vice versa, this mechanism, so far as transverse equilibrium was concerned, having directional response in accord with the instinctive motions of the pilot's body. Steering was accomplished by means of a wheel mounted on a control column in front of the pilot's feet. By turning the wheel clockwise the machine steered to the right, and vice versa. By pushing the column forward the machine was made to nose downward, and vice versa. The shoulder yoke and the vertical control column comprised two separate means for controlling the transverse and longitudinal equilibrium, respectively.

36 XL

Captain Ferber of the French Army conducted certain aeronautical experiments with gliders and airplanes from 1902 to 1906. These experiments were carried on at Nice, France, until 1904, and then at an army post at Chalais-Meudon, France.

Prior to Esnault-Peleterie's French application for patent filed January 19 and January 22, 1907, which matured into French patents nos. 373763 and 373818, two printed publications were issued in France by Captain Ferber, as follows: "The Progress of Aviation since 1901 by Gliding Planes, published 1904," and "The Progress of Aviation by Gliding Planes—Step by Step, Jump by Jump, Flight by Flight, published 1906." Copies of these, defendant's exhibits D–68a and D–68b, are by reference made a part of this finding.

These publications show and describe biplanes having a front elevator. Triangular "focs" or jibs are located in the opposite extremi-

ties of one of the plane surfaces. These are mounted to turn on a vertical axis and when so turned functioned to increase the resistance of that end of the plane thereby having a directional steering or turning function.

The means whereby these "focs" were turned or controlled is not shown or described in these publications.

There is no disclosure in these publications of the operating means for controlling the longitudinal or lateral equilibrium of the airplanes.

XLI

Captain Ferber's first experimental airplanes had either one or two horizontally mounted rods which were pushed or pulled in the direction of their axes for operating the elevator to cause the plane to nose up or down and were swung from side to side to operate the "focs" or jibs for steering the plane. Such planes were constructed in 1904.

In 1905 the jibs were no longer mounted vertically but pivoted on axes of about 45 degrees. The result of this change was that the jibs functioned not only as rudders but also as ailerons so as to introduce a lateral equilibrium control, combined with steering control.

In the spring of 1905 Captain Ferber constructed an experimental machine in which the horizontal control levers were replaced by a three-sided rectangular frame erected in a vertical position, flexible joints permitting this frame to be twisted or moved in any direction. Control was effected by the pilot grasping the lower horizontal bar of the frame and moving the same forward or backward to ascend or descend, and moving it axially to the right or left to turn and bank the airplane.

This machine was rebuilt in the latter part of 1905 and a closed rectangular frame substituted for the three-sided frame. The elevator was controlled by the fore and aft motion of the frame and the jibs or ailerons were controlled by a transverse motion or working of the frame. Still another machine was built by Ferber at Chalais-Meudon in 1906 in which a vertical frame was likewise used to operate the controls, except that the ailerons were actuated by moving the upright members of the frame alternately fore and aft.

37 There is no evidence that any of these airplanes had steering means separate and distinct from lateral equilibrium controlling means.

There is no evidence that any of these experimental machines are in existence, and no contemporaneous photographs or drawings disclosing details of connection of the controls are in existence.

There is no evidence that Captain Ferber made application for a patent earlier than July 19, 1907, at which time he filed a patent application in France entitled "Arrangement for control of the rudders of an airplane."

The army post at Chalais-Meudon was not open to the general public. A permit had to be obtained from the commanding officer in order to obtain access thereto.

There is no evidence that the plaintiff, Robert Esnault-Pelterie, ever witnessed any of Captain Ferber's tests, or ever saw any of his airplanes, or obtained any knowledge of his equilibrium controlling or steering-control means prior to January 19, 1907.

XLII

In 1911 Esnault-Pelterie was commencing a series of suits in France based upon his French patents, and through his patent attorneys, Armengaud Jeme et Fils, notified Louis Bleriot, an experimenter and manufacturer of airplanes, of alleged infringement of his French patents.

Bleriot directed the attention of Marcel Armengaud of the fact that in 1901–1903 he had constructed a flying machine of the flapping wing type, which had a control system including a horizontal lever mounted on a universal joint at the rear of the pilot, the forward lever adjacent the pilot being provided with a pair of handlebars or forks which projected forward on either side of the pilot. This lever was connected to a control element comprising an integral horizontal and vertical rudder.

XLIII

A translation of a letter written to Armengaud on February 10, 1911, by P. A. Vautrin, who constructed this airplane for Bleriot, reads as follows:

"Monsieur Armengaud:

"I saw Mr. Bleriot last Saturday. He asked me if I could remember the control (gouvernail) of the flapping wing airplane that I constructed at his place, rue Duret, 14 or 16, about 1901, '02, or '03. I do not remember exactly, and to write to you on this subject. Yes, sir; Mr. Bleriot and I studied this double control, direction, and height (profondeur), and I constructed myself, helped by several companion mechanics, rue Duret, about the date above stated.

"Enclosed is a diagram of this control.

"The aviator, facing forward in the direction of the arrow, is placed between the two handles of the control of the rudder, which makes only one piece with four arms, *a b c d*, and the frame *e* articulated at *f* and *g* to the cross piece *h*. The cross piece *h*, of which the rectangular frame gives to it a great deal of amplitude, is articulated at *i j* to the fork *k* fixed to the tubular frame. The arms *a b c d* are
respectively and constantly situated in the prolongation of
38 the axes *f j g i* which intersect at the point *o*. At the extremity of the tube *l* mounted in a sleeve of the fork *k* is fixed a second cardan (universal joint) similar to the first, controlled by the latter by means of wires *m n o p*. It is useless to make the de-

scription of this second cardan which resembles almost exactly the first one.

"The rudder properly called is mounted in the sleeve q, Fig. 1 and Fig. 3. The rigidity of its axis (a tube) is augmented by the action of the pulling wires connected respectively to the ends of the arms a' b' c' d' at the extremities of the cross pieces of the rudder a^2 b^2 c^2 d^2.

"Figure 2 represents the two cross pieces h and h', and Figure 3 the rudder, the sleeve in which it is mounted and the four arms, the whole making only one sole piece.

"If one wishes to control in height (profondeur) for rising for example, one presses down on the handles. The contrary if one wishes to descend. If one wishes to control in direction, to the right, one pushes the handles to the left. If one wishes to control in height for rising and in direction to the right, one presses down on the handles obliquely to the left. In a word one carriers the handles to the side opposite to that one wishes to go.

"One is obliged to employ these two cardans, being given the distance which separates the aviator from the rudder."

The sketch which accompanies the letter and which is entitled "Rudder with Two Objects—Direction and Elevation", is illustrated herewith:

39 XLIV

As a result of the disclosure referred to in findings XLII and XLIII, an agreement was prepared and signed by Esnault-Pelterie and Bleriot under date of November 1, 1911.

The agreement in its preamble recites plaintiff's French patents of December 1906 and January 1907 and certain French patents of Bleriot applied for February 9, 1907, and April 26, 1907. The preamble continues as follows:

"In consequence of claims made by Mr. Esnault-Pelterie against Mr. Bleriot, relative to his single bell lever, Mr. Bleriot has been able to prove to Mr. Esnault-Pelterie that he was in prior, legitimate, and personal possession of the invention—that is to say, of the single lever mounted on a cardan joint—by proofs accepted by Mr. Esnault-Pelterie.

"Under these circumstances the two parties have decided to conclude an arrangement consisting in putting in common their French patents in order to reciprocally enforce the rights thereto attached which secure to them the ownership of the single lever control of the organs of stabilization in airplanes, and they have entered into the present agreement."

Articles III and IV of this agreement are as follows:

"Article III

"By reason of the legitimate and prior possession strictly limited to the person of Mr. Bleriot, the latter will be able to provide his

machines with his arrangement of single bell lever without paying any royalty to Mr. Esnault-Pelterie, or, in other words, he will have the free use of his invention for all the levers with which his apparatus shall be provided and for all those that he will furnish directly to the private industry.

"Article IV

"By reason of this circumstance that the patents of Mr. Esnault-Pelterie are all prior to the patents of Mr. Bleriot, the latter engages himself to pay to Mr. Esnault-Peltrie half of the amount of the royalties that he will receive from his existing and future licensees for the single bell levers mounted in cardan (universal joint)."

A translation of this agreement, defendant's exhibit D–32b, is by reference made a part of this finding.

XLV

The expression "in prior, legitimate, and personal possession of the invention" is a phrase peculiar to the French patent law. It indicates a secret possession or knowledge legitimately obtained of a patented invention prior to the application for a patent.

XLVI

The disclosure in the Vautrin sketch relates solely to an elevational and directional rudder; lateral equilibrium control is not disclosed. The directional response accomplished by the mechanism shown in the sketch is contrainstinctive in character in that raising the handlebar depresses the elevational rudder and would cause the machine to nose down and moving the handlebar to either side would swing the directional rudder to the opposite side and thereby steer the machine in a direction opposite to the movement of the handlebar. The sketch does not disclose a vertical lever for operating both longitudinal and transverse stabilizing means so connected to the controlling surfaces that the tilt of the airplane will follow the tilt of the lever.

XLVII

The control system in which a universally pivoted vertical lever is utilized for controlling the two equilibria of the airplane so connected that the tilt of the airplane follows the tilt of the stick and in which sysem the horizontal steering is accomplished by a foot lever, has been widely adopted in France and in the United States. The greater part of all machines used by the French Government during the World War, including several thousand manufactured by the plaintiff, employed this system, it being one of the two control systems which were accepted as standard controls by the French Government for its service planes. This system was used almost uni-

versally in the training planes adopted by the United States Government during the World War. This control system is one of the two standard controls in use by both the Army and Navy of the United States at the present time, and is generally employed in all but the heavier types of machines, which, because of their comparative size and weight, require a greater controlling force than can be conveniently applied by a pilot to a simple vertical lever.

This system of control is the most satisfactory control ever had from the standpoint of training and from the standpoint of the minimum amount of attention required.

Conclusion of law

Upon the foregoing special findings of fact, which are made a part of the judgment herein, the court decides as a conclusion of law that the plaintiff's patent is valid and has been infringed by the United States and that he is entitled to compensation therefor under the act of June 25, 1910, 36 Stat. 851, as amended by the act of July 1, 1918, 40 Stat. 705, and Section 155 of the Judicial Code.

Opinion

BOOTH, Chief Justice, delivered the opinion of the court:

The plaintiff, Robert Esnault-Pelterie, is a citizen and resident of France. At a comparatively early age he became a student and experimenter in the science of aeronautics, attaining high rank as an inventor and practitioner in the art of aviation. The United States Patent Office on November 3, 1914, granted to plaintiff letters patent #1115795 under circumstances to be referred to in detail later in this opinion.

Plaintiff in the petition charges the defendant with having infringed his patent rights, and specifically relies upon the
41 validity of claims 2, 5, 6, 7, 8, and 9 of the letters patent to sustain the charge. The suit is brought under the act of June 25, 1910 (36 Stat. 851), as amended by the act of July 1, 1918 (40 Stat. 705), and section 155 of the Judicial Code.

In the first brief of defendant the jurisdiction of the court was challenged and a repetition of the defense was included in defendant's second brief. The defense was not pressed in oral argument, and, as we understand it, was finally abandoned. At any rate, finding II with respect to this issue is amply supported by the record and we have no doubt as to our jurisdiction under section 155 of the Judicial Code.

The defense to the suit is predicated upon three grounds: First, the invalidity of the patent because anticipated by the prior art and lack of novelty; second, the claims are not supported by the disclosure; and, third, the claims should be restricted to the precise devices described, and defendant did not use or cause to be manufactured any airplanes embodying this precise mechanism.

Plaintiff's patent is for what is known in the art as the "joy stick", a single vertical lever so connected with the equilibrium controlling organs of an airplane as to enable the pilot thereof to cause the same to assume any required attitude in flight. The novelty of the invention and detail of its construction, as well as operativeness, we will discuss later in this opinion.

The solution of the present controversy, despite familiarity with same, involves a repetition of the principles of flight, and at this point it is essential to state and keep in mind that we are dealing with an art at a time when it was in an initiatory, formative state. The possibility of flying a heavier-than-air machine had but recently been demonstrated, i. e., a plane propelled by motive power and carrying a passenger or passengers when the plaintiff's inventions were applied for, and the various devices and mechanisms developed to control the stabilizing organs of the plane in flight, indisputably demonstrate that the necessity therefor was imperative, and existing ones, to say the least, not satisfactory.

It is a scientific fact that it is the reaction of the air upon the wing surfaces of a plane that supports the same in the air through which it travels. To secure this reaction in the type of machine involved, a propeller and a motor are employed. A minimum of maintained speed is indispensable to flights. Two types of control are involved in the piloting of a plane, i. e., directional and equilibrium control. Directional control is effected by the functioning of a vertically hinged control surface located generally in the rear of the fuselage, a control surface which corresponds to a rudder on a ship and is operated by the pilot to direct the course of the plane and correct yawing if the same should occur. The steering of an airplane in normal flight is not usually a critical control. "It is", as finding X states, "immaterial whether the machine flies toward one point of the compass or another so far as its safety is concerned."

Equilibrium or attitude control, on the other hand, involves two vital and important factors, i. e., longitudinal equilibrium control and lateral equilibrium control. Longitudinal equilibrium control is effected by the functioning of what is known in the art as an "elevator", which is in fact a horizontally hinged rudder located
42 at the rear of the fuselage, capable of being moved upward or downward by the pilot, thus varying the angle of attack of its surface, thus lowering or raising the rear of the aeroplane, and enabling the pilot to either ascend or descend as his flying course exacts.

Lateral equilibrium control is effected by what may be fundamentally termed "wing distortion." Originally in order to accomplish this a portion of the outer end of each wing surface was constructed to yield to a warping force whereby one such surface was inclined upward and the opposite downward, producing a resultant decreased lift on one surface and an increased lift on the opposite one, thus causing the plane to roll about its longitudinal axis.

Maintenance of lateral equilibrium is a factor of extremely vital importance to safety in flight. Unequal air currents, air pockets, and tumultuous atmosphere, all invisible to the pilot and constantly to be anticipated, very frequently disturb the lateral equilibrium of an airplane, and it is of very great importance that this temporary loss of equilibrium be immediately regained.

The original process of wing warping has been generally if not universally superseded by ailerons, which are concededly direct mechanical equivalents for wing warping. (See Wright Co. v. Herring-Curtiss Co., 204 Fed. 597, 607, 608, later sustained by the Circuit Court of Appeals, second circuit. See 211 Fed. 654.) Ailerons are standardized portions of the outer rear wing surfaces, hinged in place and capable of movement so as to distort or alter the contour or form of a portion of the wing surfaces and thus obtain precisely the same air reactions obtained by wing warping. Their presence neither increases nor diminishes the total wing surface, and they are operated by the pilot for lateral equilibrium control.

A rolling movement or change of attitude from horizontal flight is incidental whenever the pilot wishes to turn the plane to the right or left. The turning of a plane is effected by means of its rudder, and to avoid sharp turns calculated to produce skidding, or, as stated in evidence, "side-slips", banking is resorted to, i. e., a more or less gradual inclination of the plane designed to overcome any centrifgal force brought into play by the turning movement, and the so-called "banking movement" is effected by the pilot operating the organs of lateral equilibrium control, the ailerons. The differential drag of the wings of a plane, manifest when the plane is banked or subjected to the rolling movement, develops a deviation from its directional course, i. e., "a yaw", the degree of which is dependent upon the angle of the roll and "upon the character of structure employed for altering the wing surfaces."

The uncertainty of atmospheric conditions and their contrariety of movement in a majority of the time during flight induce simultaneously a disturbance of both longitudinal and lateral equilibrium, and to correct the same "it is necessary that the airplane shall be tilted in an oblique vertical plane lying between the longitudinal and transverse planes of equilibrium or attitude control." In other words, the pilot may not resort to a sole banking movement as in effecting a turn but must simultaneously incline or tilt the plane at such an oblique angle as will restore the same to normal equilibrium. The frequency of disturbed air conditions and the various angles of resistance involved therein render it necessary to
43 meet this complicated control condition in the majority of instances of attitude control.

While turbulent air conditions may be met at any altitude, it is not disputed that a disturbed condition of the air generally prevails until an altitude of two or three thousand feet is reached, and due to this precarious condition present at landing and taking off it is

most essential to provide simple means for controlling the equilibrium and proper attitude of the plane. The crucial problem in the very beginning of designing airplanes for flight was as the Wright brothers said in 1908, "exactly what we knew it must be—the question of equilibrium."

The utility of ailerons to control lateral equilibrium; of elevators to accomplish ascent and descent; of a rudder to effect directional control; of a stabilizing surface near the rear of the fuselage to aid horizontal equilibrium of the plane, as well as dihedral wing surfaces, was old in the art. The problem facing aviators during the period of time involved herein was the creation of an appropriate and effective means for manually controlling the above stabilizing organs of the plane, a means which would enable the pilot to easily and with a minimum of mental effort effect the maneuvers incident to flight, add materially to its safety, and simplify operativeness.

Prior to a detailed discussion of the patent in suit, it is necessary to consider three related French patents issued to Esnault-Pelterie, plaintiff, based upon applications filed in France prior to the filing of the United States application which matured into the patent in suit.

These French patents are tabulated herewith in the order of their date of issuance, and for the sake of brevity will be hereafter referred to as the Esnault-Pelterie French patents numbers 1, 2, and 3, respectiveiy.

Number 1: French patent to Esnault-Pelterie, #372753, entitled "An airplane with two pairs of movable wings", applied for December 19, 1906; granted February 28, 1907.

Number 2: French patent to Esnault-Pelterie, #373763, entitled "An airplane with deformable wings to give it equilibrium and with stabilizing and elevating rudders", applied for January 19, 1907; granted March 28, 1907.

Number 3: French patent to Esnault-Pelterie, #373818, entitled "Airplane", applied for January 22, 1907; granted March 28, 1907.

Number 1: French Patent to Esnault-Pelterie, #372753

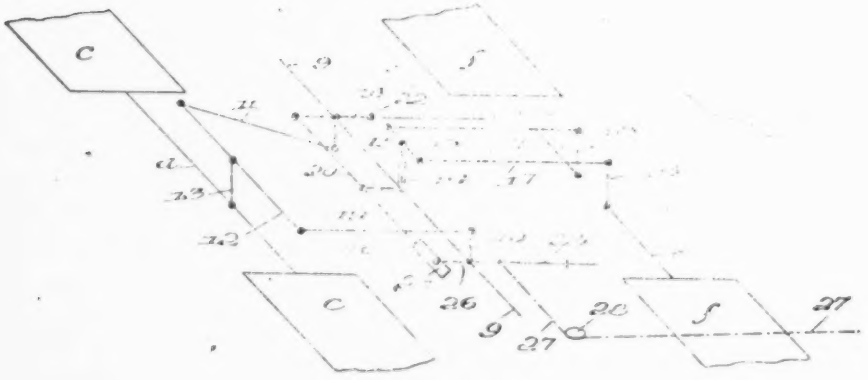
The disclosure of French patent number 1 relates to an airplane having two pairs of wings arranged in tandem. Each pair of wings is supported upon shafts which are rotatable in the fuselage so that the angle of the attack of the wing surfaces with respect to the air may be altered. The shaft connecting the front pair of wings is solid so that the angle of attack of the two wing surfaces of either side of the fuselage is always the same. The rear pair of wings is mounted upon separate shafts, thus enabling the rear wings on each side of the fuselage to be adjusted to different angles of attack under certain conditions.

44 A rudder movable about a vertical axis is mounted at the rear of the fuselage adjacent the rear pair of wings, this rudder functioning to give directional control.

The rotatable wings function to impart longitudinal and lateral equilibrium control to the airplane and as the mechanism which imparts the controlling movement to these wings and rudder is somewhat of a complicated nature, and requires detailed consideration, fig. 4 of this French patent is illustrated here in order to more clearly disclose its operation.

The basic elements of this controlling system comprise two horizontal levers, 22 and 23, respectively, each universally mounted with respect to a horizontal shaft 9. Horizontal levers 22 and 23 are so mounted that the outer ends or right-hand ends of these levers, as

Fig. 4.



French Patent 372,753
M. Esnault-Pelterie

shown in the above figure, are adapted to be grasped by the right and left hands of the pilot, respectively. The inner end of these levers extends beyond the shaft 9 and is interconnected by a cross member 20 which is fastened to the right-hand lever 22 by means of a ball and socket joint, and to the left-hand lever by means of a slot or sliding connection.

The cross member 20 is connected at its middle point with a horizontal part 19 of a right-angle lever also pivoted on shaft 9, the vertical portion of which 14 carries at its top a crossbar 16 connected by linkages 17, 17, to levers 18, 18, connected to the respective shafts e, e, of the rear wings f, f. The right-hand lever carries a downward extension arm 10 connected by a link 11 to a horizontal cross member 12 carried on a vertical arm 13 connected to the shaft d, upon which the front wings c, c, are mounted. The left-hand lever car-

ries an upwardly projecting member 10 connected by a similar link 11 to the left-hand end of the cross member 12. The left-hand lever 23 is connected by a flexible cable 27 to the aforementioned vertical or directional rudder not shown in this particular figure.

45 By virtue of the universal mounting of horizontal control levers 22 and 23 on the shaft 9, the pilot can impart to each of these levers either a horizontal or vertical movement, or a movement in an oblique direction which possesses both vertical and horizontal components. A horizontal movement of the handle end of lever 22 or the horizontal component of an oblique movement of this lever imparts a sidewise movement to the cross-connecting member 20 which through the member 19 imparts a rotative movement to the vertical portion 14 of the L-shaped member 19, 14; such movement imparts a rotation to the crossbar 16 which in turn through the links 17 imparts a differential movement to the rear wings e, e, causing one of these wings to increase its angle of attack and the other to decrease its angle of attack. Such horizontal movement or horizontal component of movement of the right-hand lever 22 thus effects the lateral equilibrium control of the airplane in a direction causing the airplane to roll in the direction in which the horizontal lever 22 is pushed.

The longitudinal equilibrium control of the machine is described as being effected by raising or lowering the handle end of the right-hand lever 26; such control, however, is complicated by the fact that the right and left-hand levers are interconnected by the cross member 20 in such manner that the inner ends of each lever form a fulcrum point upon which cross member 20 pivots. Such longitudinal equilibrium control, as is described, can, therefore, only be effected by movement of the right-hand lever in a vertical plane at a time when the left-hand lever is held in a fixed position by the left hand of the pilot. Any movement of the left-hand lever in a vertical plane will act to shift the fulcrum point and move the front wings in a contrary direction and thus cause a variation in the amount or degree of equilibrium control applied to the plane by movement of the right-hand lever through a given distance.

This variable effect of relative vertical movement of the right and left-hand levers is further complicated by the fact that the right-hand lever is connected to the pair of front wings by a downwardly projecting member 10 and link 11 whereas the left-hand lever is connected to the front wings by means of an upwardly projecting member 10 and link 11. Any vertical movement of levers 22 and 23 therefore exerts a contrary or opposite longitudinal equilibrium controlling effect.

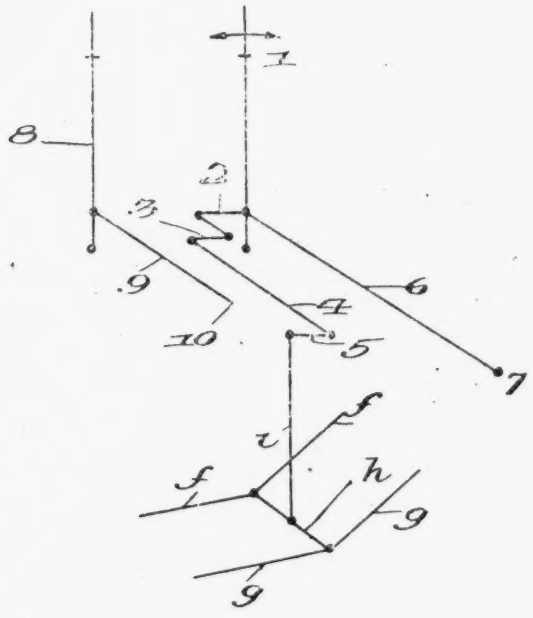
This patent therefore discloses "a two stick" longitudinal equilibrium control in which the pilot must manipulate two horizontal interconnected sticks and must continuously maintain his hold upon both of the said levers, and in order to obtain longitudinal equi-

librium control by a vertical movement or vertical component movement of the right-hand lever he must, at the same time, maintain the left-hand lever stationary and in a predetermined position.

Number 2: French Patent to Esnault-Pelterie, #373763

The structure herein disclosed comprises an airplane of the monoplane or wing wind type in which the wings are deformable or dis-

Fig. 6.



French Patent 373,763
M. Esnault-Pelterie

tortable in order to obtain lateral equilibrium control. A pair of vertical and horizontal rudders is mounted on a wing member at the rear of the fuselage, the vertical rudders giving directional
46 control and the horizontal rudders giving longitudinal equilibrium control. The ring is so mounted that the vertical rudders may be deflected in a substantial vertical plane, and the horizontal rudders may be deflected substantially in a horizontal plane.

The mechanism effecting the control of the plane, as illustrated in fig. 6 of this French patent, is illustrated here.

The vertical lever 8 is connected by a link 9 to a lateral point of the link carrying the rudders. Movement of the lever 8, fore and aft, moves the ring in such a manner as to cause the directional rudders to function. The vertical lever 1 which is on the right hand of the pilot seat, is mounted on a ball-and-socket joint. Inclination of this lever to the right will cause a pull in a forward direction on link 4 rotating a cross member *h* in such a direction as to cause a pull on the left-hand bracing wire *g* connected to the relative portion of the left-hand wing and at the same time releasing the tension on the bracing wire *g* going to the rear of the right-hand wing. Reversed conditions apply to the bracing wires *f*, *f*, so that an inclination of the vertical lever 1 toward the right will cause the plane to roll to the right, and vice versa.

A forward movement of the vertical lever 1 causes a pull on the link or rod 6 which is connected to the bottom of the ring; therefore the forward motion of lever 1 pulls the bottom of the ring forward and moves the horizontal rudders in such a direction
47 as to cause a nosing down of the airplane. Moving the lever 1 in the opposite direction or back will cause the plane to nose up. The French patent also refers to the advantages due to the fact that the lever 1 may be movable in an oblique direction and therefore simultaneously introduce transverse and longitudinal equilibrium control.

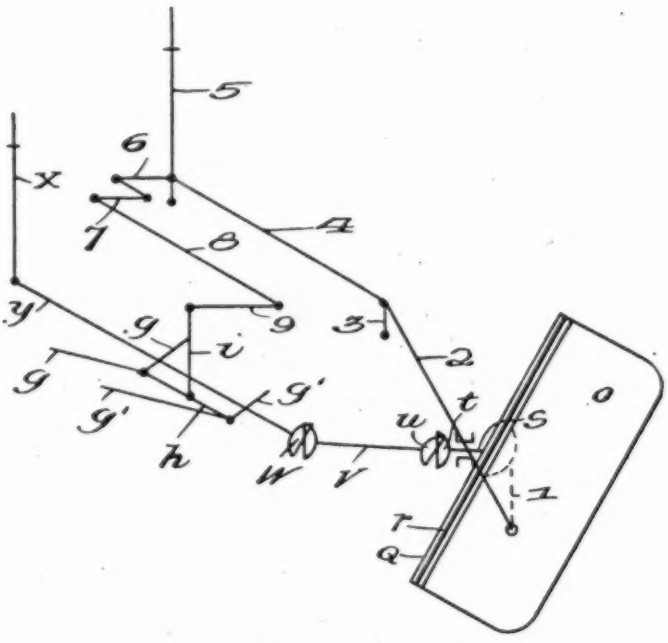
As disclosed in this French patent, each of the vertical levers thus had a separate and independent function, the left-hand lever being utilized for directional control of the plane and the right-hand lever being utilized to maintain both lateral and longitudinal equilibrium control. The directional equilibrium response of the plane follows and is in accord with the angular displacement of the right-hand lever.

Number 3: French Patent to Esnault-Pelterie, #373818

This patent discloses an airplane of the monoplane type quite similar to that disclosed in the Esnault-Pelterie French patent number two; the only substantial difference is in the construction of the tail. Instead of having separate vertical and horizontal surfaces for directional control and longitudinal equilibrium control, respectively, the disclosed construction has a single surface which is mounted on a normally horizontal axis. This surface is capable of movement on this horizontal axis so as to increase or decrease the lifting effect of this tail surface, thereby controlling the inclination or attitude of the plane on its longitudinal axis. This tail surface may also be rotated about the longitudinal axis of the plane, thereby causing the rear of the plane to yaw to one side or the other, thereby introducing a directional control.

As disclosed in fig. 4 of this French patent, reproduced on the next page, the left-hand lever x by its movement from side to side rotates the bar y and through the universal joints w, w rotates the rear control surface about the longitudinal axes of the plane for directional control. The right-hand vertical lever 5 is universally mounted at its lower end and by manipulation from side to side effects lateral equilibrium control in the same manner and in the same direction as

Fig. 4.



French Patent 373,818
M. Esnault-Pelterie

described in connection with the previous French patent number two. Movement of the lever 5 in a forward direction pulls on the wire 4 and link 2, which is connected with a dependent horn 1, thus giving the rear control surface a greater angle of attack and causing the plane to nose down, a reverse or backward motion of lever 5 causing the airplane to nose up, the directional response of the airplane therefore being in accord with the inclination of the universally mounted vertical lever 5.

As more fully set forth in finding VI, plaintiff actually constructed and operated an airplane of the type disclosed in this French patent. This machine is now a part of the collection in the Conservatoire des Arts et Metiers in Paris.

Plaintiff at first executed an application for United States letters patent based on all three of his French patents discussed supra. This application, however, reached this country too late for filing within the statutory time limit with respect to the first French patent. Plaintiff then executed a second application for United States letters patent basing the same on his French patents numbers
48 two and three and omitting reference in the oath to his first French patent. This is the application which matured into the patent in suit. As the facts relating to the filing of these applications are fully set forth in finding VII, it is unnecessary to reiterate them here. It is sufficient to add that from consideration of the file wrapper of the United States application, which matured into the patent in suit, it is apparent that the same is directed to the same invention and monopoly disclosed in the second and third French patents, and, therefore, under the second paragraph of section 4887, Patent Statutes, which relates to priority by treaty, the filing date of the patent in suit, which so far as the invention is expressed by the claims in suit relates back to January 19, 1907, and January 22, 1907, respectively, the filing dates of the Esnault-Pelterie French patents numbers two and three which disclosed to those skilled in the art the arrangement and operation of the control elements which we have specified in our consideration of these patents in suit.

We quote herewith this pertinent portion of section 4887, title LX:

"An application for patent for an invention or discovery or for a design filed in this country by any person who has previously regularly filed an application for a patent for the same invention, discovery, or design in a foreign country which, by treaty, convention, or law, affords similar privilege to citizens of the United States shall have the same force and effect as the same application would
49 have if filed in this country on the date on which the application for patent for the same invention, discovery, or design was first filed in such foreign country, provided the application in this country is filed within twelve months in cases within the provisions of section forty-eight hundred and eighty-six of the Revised Statutes. * * *"

As the plaintiff's first French patent was not issued until February 28, 1907, and was not published until April 18, 1907, this patent cannot be considered as prior art. At this point, however, we will also refer to the first paragraph of section 4887, which states:

"No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery * * *, unless the application for said foreign patent was filed more than twelve months * * * prior to the filing of the application in this country, in which case no patent shall be granted in this country."

Because of this section of the statutes it would be impossible for plaintiff to obtain a monopoly under the United States patent for the same invention disclosed in its first French patent but the

statute does not preclude him from obtaining a monopoly by virtue of the United States patent for an invention which differs from or is a patentable improvement upon the structure disclosed in its first patent.

We will discuss the question of the effect of the first French patent more completely after we have given consideration to the patent in suit.

The Patent in Suit

The patent application, which matured into the patent in suit, was filed in the United States Patent Office on January 16, 1908, and was, as already indicated, based upon the two embodiments disclosed, respectively, in the plaintiff's French patents numbers two and three. The drawings as filed in the application contained figure 6 and 4 of plaintiff's French patents numbers two and three, heretofore illustrated.

The Patent Office's first action required the applicant to supply new drawings which should set forth the mechanism in greater detail. In response to this request plaintiff filed new drawings on February 1, 1909, which included figures 6 and 10 illustrating specifically the control mechanism which we reproduce on the following page for the purpose of illustration.

With reference to these figures the specifications of the patent state in part as follows:

Figure 6

"The distorting of the wings and the control of the inclination of the rudders can be performed in the following manner: To a vertical lever 61 mounted on a ball and socket and located, for example, on the right hand of the pilot, is connected, on the one hand, through an arm 62, an angle lever 63, a horizontal bar 64 which is hinged to the end of a horizontal arm 65 keyed at right angles on the vertical rod 55 operating the stay-wires. On the other hand the said lever 61 is connected through a rod 66 hinged thereto, to an attachment 67 on the lower end of the ring 58 (Figs. 4 and 5). It will now be seen that by moving the lever, either to the right or to the left, the rod 55 is induced, through this system of transmission, to rotate and thereby the wings are distorted, thus controlling the transverse stability. Moreover, by moving the said lever 61, forward or backward, the rod 66 will be pulled or pushed, and the rotation about an imaginary horizontal axis, that is, the forward or backward inclination of the ascensional rudder 60, will be obtained. Furthermore, by moving the said lever 61 in a direction intermediate the right or left and the front or back, the rod 55 and the rod 66 will be simultaneously affected, that is, the means for controlling the transverse stability and the means for controlling the longitudinal stability will be simultaneously actuated.

"Another lever 68, symmetrically arranged with the lever 61 as regards the pilot seat, is again connected through the rod 69, to a

lateral point 70 of the ring 58; thus by moving it fore or aft, the rotation about an imaginary vertical axis of the ring 58 and consequently of the directing rudder 57 will be effected."

Figure 7

"At the rear part of the covering 9 is the double-hinged rudder 71 formed with a horizontal plane or concave surface. The said rudder is so mounted that it can be turned about its longitudinal horizontal axis 72 which, for example, may be hollow and may engage a cylindrical fixed bar 73 used as a holder. To this bar 73 is connected an axis 74 (fig. 10) mounted in a bearing 75 and fixed to the first fork

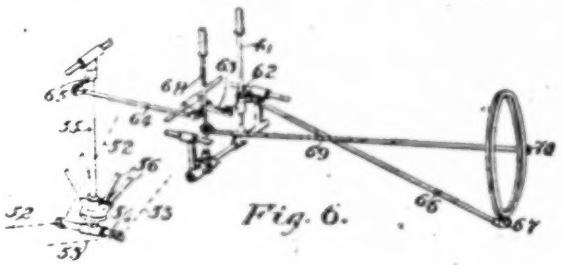


Fig. 6.

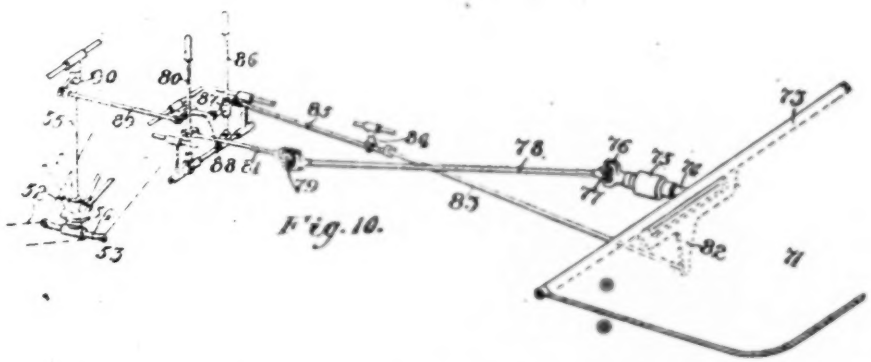


Fig. 10.

76 of a Cardan joint, the second fork 77 of which is connected, through a bar 78, to a second Cardan joint 79 which is itself connected to a vertical lever 80, through a longitudinal and horizontal bar 81. On the other hand, the hollow axis 72 of the rudder 51 is secured to a vertical rod 82, connected through a rod 83 hinged to a small vertical arm 84, to a longitudinal bar 85 ending in another lever 86 placed symmetrically with the lever 80 with reference to the pilot's seat 28. On the one hand, it will be possible with the lever 80 which is moved either to the right or to the left, to cause the bar 81 and with it the bar 78 of the axis 74, to turn and thus to turn the rudder 71 about the said axis 74, and consequently to lower one side and raise the other. Such working has the effect of generating a horizontal power which causes the machine to turn and permits of steering horizontally. This is the way the

birds and particularly the seagulls use their tails when they desire to turn. On the other hand, by moving the lever 86 forward or aft the rudder is caused to move about its axis 72, so as to lower or raise its front part. This is the way by which the longitudinal stability of the aeroplane will be controlled and the ascent or descent of the latter will be obtained. Moreover the lever 86 is connected through a horizontal bar 87, to an angle lever 88, and a longitudinal bar 89 hinged to the said lever, with an arm 90 perpendicular to the rod 55 which, in turn is secured to the bar 54. When moved either to the right or to the left the lever 86 which is mounted on a ball and socket at its lower end, will cause the rod 55 and thereby the transverse bar 54 to turn, which will have the effect of distorting the front pair of wings.

"The lever 86 is, furthermore, adapted to simultaneously actuate the rod 55 and the rod 85 in a manner similar to that described above in relation to the lever 61, fig. 6."

The facts relating to the disclosure of the patent in suit, and the details of the embodiments thereof, are specifically set forth in our findings XIII, XIV, and XV. We have, however, inserted the above illustrations and have quoted from certain portions of the patent, which we believe establish an entirely satisfactory basis of disclosure for the claims in suit. The "single vertical lever movable in every direction for controlling", shown in detail in both illustrations and described in the specification, and its connection are so illustrated and described that its direction of movement to produce a given response in the equilibrium control of the airplane is instinctive in character.

There is considerable contradictory testimony in the record by the various experts for both the plaintiff and defendant on the question of instinctive control. Defendant's experts urge that there is no virtue in having the equilibrium control lever or "joy stick" so connected to the control surface that instinctiveness plays a part in the manipulation of this lever by the pilot. The defendant in its brief urges that the operation of the joy stick is a matter of acquired habit. We agree with this latter statement with the qualification, however, that any given habit is easier to acquire if it is instinctive rather than contra-instinctive.

There is no doubt that every human being automatically attempts to maintain his balance or equilibrium at all times and if moved off balance in any direction instinctively effects an opposite mental and muscular response to restore his body to a normal vertical position. This is fundamental knowledge and it is unnecessary to amplify it further, other than to observe that this automatic or instinctive balancing action is well apparent to anyone who has walked the deck of a steamship while it is rolling and pitching.

52 This balancing instinct is made use of in the universally pivoted vertical control lever or the joy stick control of the patent in suit in the manner illustrated by the figure reproduced here.

The full lines of the figure are illustrative of a pilot in level flight. If, due to disturbed air conditions, the plane is caused to nose up or down, the pilot's body, due to his balancing instinct, will tend automatically to assume either the forward or rearward dotted line position, respectively, and his mental instincts will thus tend to cause him to push forward or pull backward on the joy stick, which in each case will so operate the controlling surfaces in a proper direction to restore the airplane to its previous level attitude. The same instinctive reaction will also take place when the plane rolls from side to side or assumes a position in which both longitudinal equilibrium and lateral equilibrium are disturbed. If the pilot desires to initiate a departure from level flight, the banking of an airplane when making a turn being an example of this, he has the natural instinct to lean or incline his body just as a motorcyclist does and here again the directional response is in accord with the pilot's instincts. The directional response is thus always in the proper direction with a minimum of mental effort on the part of the pilot.

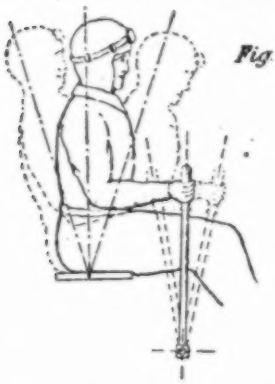


Fig D.

In certain abnormal conditions, such as when an airplane is in a spinning nose dive or is flying in fog or through clouds, the pilot cannot trust to his balancing instinct. The fact that the suppression of the natural balancing instinct necessitates special training in order that the pilot may be able to successfully meet these abnormal flying conditions, in our opinion emphasizes the use of the balancing instinct in normal flight conditions. (See finding XII.)

Brigadier General B. D. Foulois, a witness for defendant, who was at that time assistant chief of the Army Air Corps, had been connected with aviation since 1908, and had flown many types of planes, testified with reference to the joystick control as follows:

"* * * I would say that the control that we are using today, as compared to the controls that we have used in the past, is much less complicated, much easier to learn, much easier to handle, and easier to operate and control your airplane in connection with all the other various pieces of equipment and instruments that you have to handle in the plane.

"41. Q. Does your statement apply to the Dep control as well as to the stick control?

"A. I would say that the present stick control is the most satisfactory control we have ever had from the standpoint of operating your airplane, and from the standpoint of minimum amount of attention which may be required to operate all the other various pieces of equipment that you have in a plane to take care of."

It is true that the operation of the equilibrium-control lever in a direction responding to reflex or instinct, while specifically included

in claim 7, is not discussed in detail in the specification.
53 While the specification does not specifically make any reference to its advantages, they are, nevertheless, present and inherent in the detailed disclosure to which we have referred, and anyone practicing the teachings of this patent by the utilization of its disclosure will realize the benefits of this instinctiveness which are inherent in the structure disclosed. Moreover, anyone reading the patent would not neglect to read the claims and study the patent in its entirety.

It would be contrary to established precedents to hold that an omission from the specification of a discussion of the fact that the control is instinctive in direction, invalidates the patent, when such instinctive directional movement is inherent in the operation of the mechanism found in the detailed disclosure of the patent. (See Wezel & Naumann Aktiengesellschaft *v.* Morgan Lithograph Co., 54 Fed. (2d) 235, 237). In this case the court said:

"It would certainly seem contrary to justice to hold that this inadvertent omission which every one would unconsciously supply, and which could not possibly interfere with the practice of the art, should nevertheless deprive the patentee of the reward of his efforts. I think that would be carrying the technicality of the patent law too far."

One reading the specifications of the patent and studying its operation, and assuredly one operating the described mechanism, could not, if skilled in the art, escape knowledge of the fact that instinctive directional movement was a factor inseparably present in the form of construction specified. It does not exact elaboration to demonstrate to those skilled in aviation the scientific facts attendant upon resuming equilibrium when the same is disturbed either in the air or upon the ground. If the mechanism responds in operation to all human instinctive movements to restore equilibrium and the disclosure exhibits this fact by specifying its operation, this we think meets all the requirements of the patent law.

In making this statement we are cognizant of the fact that in Fig. 7a of the Esnault-Pelterie patent in suit, illustrated above, and which is not specifically described in the specification, the rudder horn 82 is reversed from the other figures and is mounted on the upper side of the tail surface of the airplane 71. In this figure, which formed no part of the original disclosure, the horn is connected to the vertical control lever 86 by means of a control wire or very thin rod 83. As the tail surface of the airplane has a lifting effect and has a downwardly curved contour for this purpose, it does not take a high degree of mechanical knowledge or skill to see that such
a construction is inoperative in that the wire or rod 83 will
54 bend or buckle by application of the lifting force on the tail surface 71 which is hinged at 73. There has been testimony in the case that points to the fact that this inoperative construction is due to a draftsman's error.

Whatever the origin of this contradictory figure, however, its effect on the disclosure of the patent as a whole, to those skilled in the art, appears to be nil.

Mr. Roche, senior aeronautical engineer for the Matériel Division of the Air Corps at Wright Field, who testified as an expert in this case on behalf of defendant, after referring to the inconsistent disclosure of Fig. 7a, was questioned as follows:

"State what kind of a structure you would produce in view of the specifications, the figures and the inconsistencies which you have considered, referring to the birdtail only and its control and assembly." He answered:

"I would construct something very much the same as the installation on the 'Vought' airplane tested at Langley Field * * *."

The structure tested on the Vought airplane comprised a tail surface with the tail control rod connected to an arm or horn underneath the tail surface, as disclosed in Fig. 10 of the patent in suit, and with the movement of the control stick in an instinctive direction. This opinion of the defendant's expert seems clearly to indicate what the man skilled in the art would construct from the teachings of the patent in suit.

If those skilled in the art, in constructing the mechanism from the information furnished by a patent, would naturally construct it so that it would possess a certain capability and mode of operation, that capability and mode of operation must be inherent in the disclosure and a characteristic of the invention expressed in the patent.

Such an evident mistake in this figure of the drawings should not render the patent invalid. (See Van Meter v. Irving Air Chute Co., 27 Fed. (2d) 170, 173.) In the Van Meter case the patentee was suing the United States under a special jurisdictional act for infringement of what he specified a "parachute apparatus or aviatory life buoy." Fig. 12 of the patent drawings disclosed constructive features and, as the court observed, it "would be hazardous for the wearer to pull the cord of the parachute in question, for throwing aside the casing and opening the chute while he continued in his seat" (p. 173). The court in the opinion said:

"This was evidently a misconception of the draftsman of the sketch. The patent is not invalid, or the claim limited to the illustration, because of this mistake or lack of understanding. See Temple Pump Co. v. Goss Pump Co., 58 Fed. 204."

The illustrated detail of construction pointed out by defendant's counsel is, we think, so obviously an error that anyone skilled in the art would at once discover it. Assuredly it is not of such consequence as to indicate a lack of apprehension on the part of the patentee as to the precise character of the mechanism he conceived and its operativeness. This obvious error was not carried into the specifications, and in all proceedings relative to the plaintiff's patent ap-

plication, played no part. Under this state of facts it is evident in our opinion that lack of utility in plaintiff's mechanism may not be predicated upon such a mistake in patent drawings.

55 Defendant contends that there has been an illegal expansion of the original invention into the monopoly as expressed by the present claims in suit. This is based upon the argument that the plaintiff did not insert claims directed to the vertical stick control until 1913 although his application was filed in 1908, and during the intervening period the device had come into general use in the United States. The contention is based upon the premise that there is a lack of equity in permitting an applicant to continue an application in the Patent Office indefinitely and to present claims directed to previously unclaimed subject-matter years after its filing date and after competitors have established actual manufacture or use.

Such doctrine obviously constitutes an exception to the long-recognized right of a patentee to claim subject-matter disclosed by him at any time so long as his patent is not yet issued.

The file wrapper and contents of plaintiff's patent disclose the proceedings in the Patent Office with respect to plaintiff's application and issue. Patent Office proceedings and patentee's responses to the same with respect to laches on the part of the latter are fixed by statute. In this case the limitation placed by law within which plaintiff must respond to action upon the part of the Patent Office was one year, and the record does not establish that plaintiff ever exceeded this period of time in responding. The Supreme Court in the case of Overland Co. v. Packard Co., 274 U. S. 417, in an exhaustive opinion involving this precise issue, decided that patent rights were conferred by statutes, and when a patentee complied with statutory provisions as to time limitations within which to proceed to obtain an issue, laches could not be imputed to him, even if he availed himself of every single day of the time allowed. The doctrine of equitable estoppel is not available to defeat patent rights if the record establishes conformity with the patent laws. In deciding this issue the court said (page 423):

"Counsel for the alleged infringer says, that even with the time limit for action on the part of the applicant thus reduced to one year, it becomes easily possible for an applicant, after an action by the Patent Office upon his application, to delay for the full period of a year his response to such action, and however promptly the Patent Office may again act, he can delay another full year before replying to it, and thus, by waiting a year after each official action, (1) keep his application pending so as to enable him to withhold, indefinitely, his invention from the public, (2) add claims to his application covering the independent intervening developments of others, and (3) postpone the time when the public may enjoy the free use of the invention—all contrary to sound public policy.

"The answer to this argument is that the matter is entirely within the control of Congress, and, in order to avoid the evil suggested. Congress may reduce the time within which one who is seeking an

adjustment with the Patent Office, in order to obtain a patent, shall act upon receipt of notice of a decision of the Patent Office, in the course of the application through that office. Congress, as we have seen by the history of the statute, reduced this time for an indefinite period in 1861 to two years in 1870, and to one year in 1897, and, as provided in the last Congress, to six months. Act of March 2, 1927, c. 273, 44 Stat. 1335"—

56 and again, on page 425, used the following language:

"A party seeking a right under the patent statutes may avail himself of all their provisions, and the courts may not deny him the benefit of a single one. These are questions not of natural but of purely statutory right. Congress, instead of fixing seventeen, had the power to fix thirty years as the life of a patent. No court can disregard any statutory provisions in respect to these matters on the ground that in its judgment they are unwise or prejudicial to the interests of the public."

In addition, it is evident and the findings show that plaintiff from the filing of the application to its date of issuance has continuously directed claims to the equilibrium control.

When the application was filed it included claims in the following phraseology:

"4. An aeroplane in which the controlling is effected by two separate levers, rigid transmissions for controlling the distortable wings and both rudders."

* * * * * * *

"6. An aeroplane in which the controlling methods of the rear tail forming the rudder is carried into effect by means of two levers symmetrically arranged with reference to the pilot seat, the left-hand lever, for example, causing through a cardan system, the rotation of the rudder about a longitudinal horizontal axis, and the moving of the right-hand lever causing the inclination thereof about a transverse horizontal axis."

Interpreting claim 4 by referring to the specifications and drawings as orginially filed, it is apparent that it covered lateral and longitudinal equilibrium control.

In its action of March 10, 1908, the Patent Office objected to the specification and all of the claims, and the patentee responded to this action by filing a revised specification, cancelling the claims as filed and substituting new claims therefor, this amendment being received in the Patent Office February 1, 1909, which was within the statutory period of one year allowed for response. Included in this amendment were two claims, as follows:

"2. An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder."

"13. An aeroplane having means for controlling its inclination and a single lever for operating said means to control both the

longitudinal and the transverse stability of the apparatus, said lever being arranged to oscillate in different vertical planes, means for transmitting its movement in one plane to the means for governing the longitudinal inclination, and means for transmitting its movement in the other plane to the means for determining the transverse stability, said lever being mounted to permit also an oblique movement having components in each of said planes so as to actuate simultaneously the means for establishing longitudinal stability and that for establishing transverse stability."

Claim 2 remained continuously in the case during the entire Patent Office proceedings, was allowed by it as claim 2 of the patent in suit, and is now one of the claims in issue. While the patentee, during the prosecution of his application, may have at various
57 times inserted more narrow claims specifying in a more detailed and more limited form the connections of the control lever, its arrangement with respect to the controlling surfaces, and the direction of response, the insertion of progressively narrower claims is but the usual method of prosecuting an application in the Patent Office and does not indicate an abandonment by the patentee in his attempt to obtain a patent monopoly on the equilibrium control.

Claim 13 to which we have referred, supra, and which includes the "single lever" for operating the equilibrium controls "said lever being arranged to oscillate in different vertical planes", and thus being directed to the universally mounted vertical lever, was canceled as the result of a Patent Office rejection on May 23, 1912.

On June 12, 1913, the patentee filed a new set of limited claims among which were claims 5, 6, 7, and 8 of the patent in suit, which claims are now in issue. The fact that from May 23, 1912, to June 12, 1913, or for a period of slightly over a year, there was not pending in the Patent Office a claim of the character as exemplified by claim 13, quoted above, is without import as at no time was there any abandonment of the broad monopoly as expressed by claim 2.

However, viewing this matter entirely aside from claim 2 and the continuity of the broad monopoly covered thereby, there was a lapse of but approximately thirteen months between the cancellation of claim 13 and the renewal of claims for substantially the same subject matter before the Patent Office. Such period is well within the two-year period rule defined by the Supreme Court in Chapman v. Wintroath, 252 U. S. 126, and Webster Co. v. Splitdorf Co., 264 U. S. 463, in which latter case the rule is applied to claims inserted in divisional cases, where there has been a disclosure to the public by the issuance of the parent application.

In the case at bar there could be no assumption of abandonment of any right to the public during this lapse of thirteen months, for during this period the application was pending in secrecy in the Patent Office, and the public was given no disclosure such as exists in the case of a reissue or a patent subsequently issued on a divi-

sional application. (See Diamond Power Specialty Corp. v. Bayer Co., 13 Fed. (2d) 337, 339.)

Such cancellation of claim 13 and the subsequent renewal of substantially the same subject-matter occurred while the contract between the inventor and the public was in a formative state in the Patent Office. As it now appears, the rejction of claim 13 and its cancellation was a mistake which the Patent Office later rectified when it allowed substantially similar claims. But mistake or not, this action by applicant was subject to reconsideration as long as the Patent Office would grant such a review.

For the reasons just outlined, and particularly in the absence of a disclosure to the public by the inventor, we fail to see how a defense of intervening rights can be established.

Aside from this consideration, however, the facts in the case at bar do not warrant any defense of intervening rights. As stated in detail in findings XXXVIII and XXXIX, the planes in public use in the United States in 1912 made use of the Wright and Curtiss types of control which were essentially different from the "joy stick" control of the patent in suit, and there is no evidence that any airplane was in existence in the United States at any
58 time when the Esnault-Pelterie application did not contain either claim 13 or the later substituted claims.

The defendant in written argument contends "that in every branch of mechanics, control levers are invariably positioned where dictated by convenience, expedience, ease of control, and available space conditions", and asserts that "the disposition of any lever is universally recognized as a matter only of mechanical skill or expediency representing the mere selection of the designer."

If the plaintiff's patent alleged to have been infringed, and the claims involved in this litigation contain no more than a mere rearrangement of elements functioning as they did in his French patent no. 1, obviously the general statement of the defendant just quoted would have great weight. Assuredly the simple process of transforming a horizontal lever into a vertical one is manual and involves workmanship instead of invention.

Invention, it has been said, originates in mental conceptions evidenced, so far as this case is concerned, by practical and operative devices or mechanisms inherently new and novel, and if the plaintiff's patent fails to meet this test obviously it is invalid. The defendant does not challenge the fact that invention is present when a patentee makes use of elements old in the art and by a new and novel combination thereof produces a mechanism which functions in a new way. If this precedent had not long since been established inventive progress would be decidedly impeded, and the exercise of the inventive faculties restricted to a very limited scope.

The Wright brothers were the pioneers in this art. Quoting from one of their many interviews and articles, we find this statement, a matter of record in this case, "The problem of the real power-

driven flying machine was exactly what we knew it must be—the question of equilibrium." Plaintiff, although he endeavored to, did not solve that problem; his mind, so far as present issues are concerned, and his experiments were directed toward the creation of a mechanism which would control the organs of an airplane which admittedly function to restore equilibrium when it is disturbed, a mechanism as indispensable to the flight of a plane as the wing surfaces thereof.

The Wright patent to be considered in this case was issued May 22, 1906, and the mechanism disclosed to operate the organs of equilibrium and directional control are described in finding XXXI. It was a cradle located upon the lower wing of the plane and connected with the directional rudder at the rear of the same, and also with the wings, so that the pilot flying in a prone position on the wing of the plane could by movements of his body shift the cradle to either the right or left and thus alter the angle of attack of the wing surfaces. Longitudinal equilibrium was obtained by a horizontal rudder or vane, as the finding discloses, located in front of the main surfaces and operated manually by means of a roller located in front of the pilot.

If the ingenuity of scientists in this art had exhausted itself in the control mechanism of the Wright patent, it is not exaggeration to state, but clearly observable, that the modern airplane would never have been developed. We think we may with confidence assert that there is not a single airplane patent cited as prior art
that does not embody attempts to not only simplify a control
59 mechanism, but concerted efforts to create one capable of
functioning efficiently, and following the demonstration of the possibility of flight by the Wright brothers, inventors turned their attention to this important feature of airplane control.

The development of control mechanisms exhibits that the difficulties encountered were manifold, and the frequent and instantaneous necessity of operating simultaneously certain organs of control, as well as single ones, was not one of instant and easy solution. The pilot of a plane has various duties to perform, and it would seem that an operative mechanism which simplifies and expedites the performance of the same embodies something more than mere mechanical skill.

Inventors repeatedly resorted to dual lever control devices, some of them very crude and others approaching a solution of the problem. The findings show that prior patentees to the plaintiff employed levers and wheels to effect control of the organs of stabilization and directional control. Some inventors used vertical levers; others, horizontal levers, and still others, a combination of levers and wheels. All of them, however, including plaintiff's French patent number one, combined operativeness in such a way that the levers and wheels engaged both hands of the pilot and possessed operative defects in the way of inseparable operation which was

capable at least of confusing the pilot and fraught with a degree of inoperativeness which precluded their general adoption.

Obviously complication in the operation of a control mechanism, apparent to all interested in the art, centered attention upon mechanisms which would obtain control responses without the inherent defects which characterized those in existence. The art, as we have said, was developing rapidly. Structural improvements and machinery were revolutionizing it, and the need for effective mechanism was acute and imperative. The very best minds of the scientists interested were active in its promotion.

On the preceding page of this opinion the illustrated mechanism of plaintiff's French patent no. 1, #372753, is inserted. A repetition of its structural features and operativeness is not essential. It is sufficient to observe that plaintiff's conception as embodied therein was evidently predicated upon a false scientific basis as to the structural features of a successful airplane, and the reaction of essential elements to the air in order to secure equilibrium. The control he attempted to exert over his illustrated organs of control, i. e., the wing surfaces, rudder, etc., of his new plane, was in no sense adaptable to his subsequent planes or to the numerous other planes then perfected for flight. We are confirmed in this respect by defendant's own distinguished expert. On cross-examination he was asked: "In the 1906 patent what would be the result if you were to merely turn the lever 22 upward instead of rearwardly in a horizontal direction as it is in the patent?" The response to the question is as follows: "It would not work." Again he was asked, "You would still, by moving it forwardly and backwardly, control the longitudinal stabilization but you could not execute the lateral movement necessary for lateral stabilization." The answer was, "You could not."

In addition to what we have just said, the record shows that plaintiff's scientific knowledge immediately disclosed to him the
60 fatal defects in his first French patent, and he promptly abandoned it. No such device was ever constructed, and, almost immediately following, the vertical lever mechanism came into existence. In the case of Olmsted v. Andrews & Co., 77 Fed. 835, 839, cited in defendant's brief, the court said: "It is not, however, invention to cause a device to work vertically that theretofore operated horizontally." The patent in the Olmsted case was for a map case, a device to secure a map in a convenient and accessible form and preserve it from the effects of constant exposure to the air.

The prior art cited in anticipation of the patent was extensive and apropos, and obviously from it the conclusion was inescapable that all the patentee did was to rearrange elements long since combined to accomplish precisely what the plaintiff's patent did. The alleged similarity between the Olmsted case and the instant one is nonexistent. We are dealing here with a developing scientific art of vast importance and in a formative state. The Wrights flew

their first plane in 1903 and plaintiff's French patents are dated in 1907, but four years later. A successful and approved operative mechanism functioning to control the ailerons, elevator, rudder, etc., of an airplane when in flight and advance the art towards perfection we feel confident in saying had not been invented.

Plaintiff's experiments and his own flights enabled him to comprehend the necessity for a mechanism such as he conceived. He brought into tangible form a single vertical lever combined with essential operative elements which successfully operated the organs of an airplane it was designed to operate, and in a way they had not been operated previously, and this he accomplished as a noted scientist in the art and after years of experimentation and knowledge of its needs and in no other way. In Robinson on Patents, Vol. 1, pp. 122–123, the author states:

"To him alone whose mind conceives the perfect, practical, operative idea—that idea which, when embodied in tangible materials, will accomplish the desired result—belongs the right of the inventor and the credit of performing the inventive act."

Viewing the two patents retrospectively and years after the patent in suit has firmly established its worth, it is not at all strange that the changes effected by the patentee in the two devices disclosed give rise to a conclusion that all that was accomplished by the change was a mere rearrangement of elements and one which would readily suggest itself to one skilled in the art. True, no one skilled in the art suggested the change and as established by the record no previous inventor comprehended the additional and vastly important results which the new mechanism brought about.

In the case of Root Refining Co. v. Universal Oil Products Co., 78 Fed. (2d) 991, 995, recently decided, a case involving the general principles of patent law applicable to patents which although simple in construction are nevertheless an advance in the art, the court used the following language:

"What Dubbs did now seems simple and just what any one skilled in the art would have done. 'This, however, is but the common history of important inventions, the simplicity of which seems to the ordinary observer to preclude the possibility of their involving an exercise of the inventive faculty.' Carnegie Steel Co. v. Cambria Iron Co., 185 U. S. 403, 22 S. Ct. 698, 709, 46 L. Ed. 968. 'It is
61 often difficult to determine whether a given improvement is a mere mechanical advance, or the result of the exercise of the creative faculty amounting to a meritorious invention. The fact that the invention seems simple after it is made does not determine the question. If this were the rule, many of the most beneficial patents would be stricken down.' Expanded Metal Co. v. Bradford, 214 U. S. 366, 29 S. Ct. 652, 655, 53 L. Ed. 1034."

On the other hand, judging efforts and accomplishments in the light of the contemporaneous development of the art, so radical a departure from the mechanism disclosed in plaintiff's first French patent, both in structural features and operativeness, as well as re-

sults which followed, must, we think, compel a conclusion that plaintiff's patent discloses a new and novel mechanism, one accepted and put into almost general use in light airplanes and continued in such use to the present day.

Esnault-Pelterie brought suit against the Chance Vought Corporation for an alleged infringement of the same patent involved in this case. The cause was first heard in the United States District Court for the Eastern District of New York, and decided by that court in a written opinion announced February 29, 1932 (56 Fed. (2d) 393). The District judge dismissed plaintiff's bill of complaint and subsequently on appeal to the Circuit Court of Appeals the decision of the District Court was affirmed (66 Fed. (2d) 474). The opinion of the Circuit Court of Appeals follows substantially the opinion of the lower court.

From statements of facts in both opinions we are confirmed in our belief that the record before this court must be in some important particulars very different from what it was before the courts mentioned.

In speaking of plaintiff's 1906 patent #372,753 both opinions hold that the whole equilibrium of the machine may be controlled by the pilot by the use of one hand. The evidence in this case, as previously observed, is to the contrary and emanates in part from defendant's expert witness. It is obvious from the present record that the control mechanism of the 1906 patent would be wholly inoperative if the horizontal levers were simply transposed into vertical ones, and we fail to find in the record any controversy over the fact that the 1906 mechanism engaged continuously both hands of the pilot, and, in addition to this, the expert testimony establishes that any vertical movement of levers 22 and 23 of the 1906 patent would result in a contrary or opposite longitudinal equilibrium control.

A conspicuous divergence in proved facts between the record in the Vought case and the instant one appears from the statement in the Vought opinions wherein it is stated (page 401 of the District Court's opinion) that "in neither of the machines embodying such invention, manufactured abroad, was the plaintiff able to accomplish sustained flying for any considerable distance." Again, in the opinion of the Circuit Court of Appeals it is said (page 475), "None was ever put into commercial use", and on page 477 it is stated "nor was it used in the only embodiment made by the patentee."

Manifestly an omission to supply testimony of the importance noted above, especially as to the reception accorded the mechanical device of plaintiff by those skilled in the art and its almost universal use in light airplanes in both this country and abroad, would lead inevitably to the quoted statements. Findings VI and XLVII portray what the record in this case indisputably establishes, and supply positive proof of precisely what the plaintiff accomplished, both in the matter of making flights and the commercial demand for planes embodying his invention.

62

It is true the defendant seeks to minimize the importance of plaintiff's flights and in so doing cites their brief duration and slight altitude attained. "His flights", the defendant says, "may be better denominated as 'hops'." It is true that some of them were of brief duration and the altitude obtained in nowise extensive; however, it must not be overlooked that on the date of plaintiff's initial flights even "hops" in a heavier-than-air plane were accomplishments. Assuredly the defendant would not designate the flight of the Wright brothers at Kitty Hawk in 1903 a hop, and yet it did not greatly, if at all, exceed the first flights of the plaintiff. The modern airplane motor had not at that time made its appearance.

Prior Art

The defendant in its brief refers to the French patent to Laroze as the most important disclosure.

The Laroze patent was considered by the Patent Office before the patent in suit was issued and was discarded by the examiner as not anticipatory.

The Laroze patent discloses an airplane provided with a vertical control lever, which can be swung in a fore-and-aft direction for the purpose of controlling the longitudinal attitude of the machine. A wheel is mounted vertically on the top of the lever. By means of swinging the wheel the lever may be rotated about its own vertical axis for the purpose of controlling the transverse attitude of the airplane. By turning the wheel on its horizontal axis the machine may be steered.

The result of this construction is that if an attempt were made to operate the longitudinal control by grasping the wheel on one side by one hand there will inevitably result a movement of the lateral control as well. When the pilot wishes to nose up or down he will also find he is operating the lateral control. Lateral control movement similarly results also in a disturbance of the longitudinal equilibrium.

This control could not be operated by one hand. Both hands must be used, one on each side of the wheel, in order to keep the movable lever or post in any predetermined position. But, even under these circumstances, the Laroze control of equilibrium is very confusing mentally and physically. If we imagine the vertical lever stationary and a lateral control movement to be given by the pilot swinging the wheel with two hands, it is evident that one hand and arm will move forward while the other hand and arm are moving backward. But in the majority of instances compound movements are required involving lateral and longitudinal equilibrium control simultaneously. This means that the arms will be required to make opposite movements for the lateral control, and forward or backward movement simultaneously for the longitudinal control. Essentially this requires sometimes a backward movement of one hand and a long forward movement of the other hand, or a slight forward move-

ment of one hand and a long backward movement of the other
63 hand, or perhaps no movement whatever of one hand and a long forward movement of the other hand. Or if the maneuver requires an opposite longitudinal control movement, the longer movements would be in a backward direction. As these control movements frequently are required to be instantaneous, the confusion, both mental and physical, is apparent.

When this is contrasted with the single direct movement of the joy stick in any direction to correct any combination of longitudinal and lateral control movements which are ever required, the value of the joy stick is apparent.

Another feature of the Laroze patent is that the patentee connects his steering control inextricably with his attitude control. Such steering not only superimposes upon the hands and arms the necessity for reverse movements in a different plane, but in addition to this it changes the value of all of the lateral control movements. This is apparent because, as the two hands rotate the wheel to steer, they require either less or more movement to effect a given amount of lateral control.

The Laroze patent does not disclose any single directional response which causes the plane to move in the direction the joy stick is moved. Nor does the Laroze control with its complicated motions in any way involve the instinct of the pilot. The Laroze patent does not possess a steering lever separate from the equilibrium control and with all these marked differences we believe it to be clear that the Laroze French patent does not anticipate any of the claims of the patent in suit.

The German patent to Schussler, #85326 of 1896, dates back to a time when aerial dynamic flight and its problems were unknown and is typical of some of the earlier visionary and inoperative structures of that period. This patent discloses an umbrella-like wing as a supporting means; a cage-like frame is connected to the approximate center of this wing by means of a universal joint mounting, this frame containing a seat for the aviator. This device is intended to be propelled through the air by means of a pair of oars which is operated by the feet of the aviator. There is a dependent rod which is rigidly attached to the wing, the lower end of which is provided with a crossbar which the aviator grasps in his hands. This dependent steering rod is stated "to give the sail any desired inclination in relation to the frame." The best operation which we can ascribe to this disclosure is that the wing might function as a kind of parachute, and by pushing or pulling at the rigid rod attached thereto the aviator may shift his bodily position in the universally mounted framework in which he sits with respect to the umbrella-like supporting surface and thus change the center of gravity. The Schussler patent does not disclose any of the fundamentals of the broad claims, 2 and 6, in suit which require that equilibrium control and steering be separate; also Schussler

has no "means" such as an elevator for maintaining longitudinal equilibrium and no "means such as distortable wings" for producing lateral equilibrium. The disclosure of the Schussler patent is not anticipatory of the claims in suit.

United States patent to Simpson 909,468, was issued January 12, 1909, subsequent to the application for the patent in suit,
64 but on an application filed January 14, 1907, approximately five days before the effective date of the patent in suit. It therefore merits consideration from the standpoint of prior invention.

This patent discloses and relates to a boat of the hydroplane type. The hull of this boat is formed of two parallel pontoons, and when the boat is under propulsion these pontoons are intended to be lifted from the surface of the water by three submerged depending hydroplane surfaces, one of which is located at the front and two at the rear of the boat. These hydroplane surfaces are pivoted to the hull, and cables are connected to them and lead to a drum located at the lower end of a vertically disposed column adjacent the pilot's seat. By means of a horizontal wheel fixed to the top of the column the drum may be turned and the cables wound about or released from the drum. The pilot by turning the wheel thus simultaneously controls the lifting effect of all three of the hydroplane surfaces.

The vertical shaft rotates in a sleeve which is universally mounted, so that by bodily moving the vertical wheel in any direction the pilot tilts the shaft and can thus move the drum at the lower end thereof in any direction. By such an arrangement if the pilot pushes the wheel forward such motion increases the incidence of the front hydroplane and decreases the incidence of the rear hydroplane, thus causing the boat to incline upward at the bow. The bodily movement of the wheel to the right increases the incidence of the right hydroplane, causing the boat to roll to the left, and vice versa.

We have grave doubts that this structure, which is in the marine art and adapted for propulsion on water, is analogous art in the present instance, in which we are dealing with aerial navigation in which directional control is necessitated in all directions.

Entirely aside from this consideration however, we find the control system of the Simpson patent closely approximating the structure of the control system of the Laroze patent discussed in detail, supra, and therefore differing from the invention in issue for this and other reasons.

The Simpson control, like the Laroze control, comprises an operating wheel mounted on the upper end of a movable column. Such mounting fails to provide any fixed fulcrum for the operation of the wheel, and any single force applied at any point on the operating wheel has no fixed or determinable response. Moreover, during all times that the Simpson boat is under way there is a pull or tendency on the cables to unwind from the drum, which tendency is transmitted to the wheel in the hands of the pilot. The pilot by maintaining this wheel in a more or less wound-up condition gives to the hydroplanes their lifting effect, and should the pilot perchance

release the rim of the wheel at any time the cables will unwind from the drum and the lifting effect of the hydroplanes will be negatived. As the top of the column on which this wheel is mounted is itself movable in all directions, the pilot must therefore continuously hold the wheel with both hands, as the release of either hand will permit the wheel to move relative to the movable column.

We fail to see how this complicated control structure either anticipates or suggests to those skilled in the art the single lever airplane equilibrium control of the patent in suit. In addition, and with respect to the more limited claims, the tilting of Simpson's wheel
65 and column in any given direction is intended to produce a corresponding rise of the Simpson boat in that direction, which is exactly the reverse of the instinctive action and directional response found in the more limited claims 7 and 8 of the patent in suit.

United States patent to Wadsworth 213079; British patent to Wilson 20022, of 1889; and United States patent to Weeber 704156, may be considered together, as they are all clearly nonanalogous art. The patent to Wadsworth, while disclosing a single vertical lever mounted on a universal joint, is adapted for the control of two engines or mechanisms, one engine being controlled by the motion of the vertical lever in one plane and the second engine or mechanism being controlled by the motion of the lever in a plane at right angles to the first plane. The patent discloses that these two engines may be respectively the steering engine and the propelling engine of "steam vessels or traction engines and the like." Certainly this patent, issued in 1879, does not in any sense suggest the concept of the equilibrium control of an airplane.

The British patent to Wilson relates to a horizontally mounted lever movable in all directions and operating a series of electrical circuits for the remote control of searchlights, guns, telescopes, and the like. There is no fixed relationship between any given position of the control lever and the position of the device controlled by it. This patent contains no reference whatsoever to aviation.

United States patent to Weeber relates to a steering and braking device for automobiles. It comprises a steering handle or tiller adapted to be swung from side to side for steering the vehicle, and the same lever is movable in an up and down direction or forwardly and rearwardly, with respect to the driver, for applying the brake of the vehicle. These functions are obviously entirely remote from the equilibrium control of an airplane, and the mere fact that an automobile may possess the same kind of an engine (internal-combustion engine) that an airplane has, or that the airplane moves on a surface of the ground prior to take-off and subsequent to landing, does not, in our opinion, place the Weeber disclosure in an analogous art, but whether analogous art or not there is nothing whatever in the disclosure of these three patents which would suggest to those skilled in the art the lateral and longitudinal equilibrium control of an airplane by means of a single universally mounted lever.

The remaining prior art patents, discussed by defendant in its brief, namely, the French patent to Penaud and Gauchot, British patent to Davidson, French patent to Macedo, German patent to Jung, and British patent to Quentin, have been considered in detail in our Findings XXV, XXVI, XXVII, XXX, and XXXV, respectively, and it is unnecessary to reiterate here the facts relating to their disclosures. As indicated in these findings, all of these patents lack one or more of the essential elements necessary to anticipate the invention in suit.

The Ferber Defense

Defendant ascribes paramount importance to the work of Captain Ferber of the French Army. From 1902 to 1906 Captain Ferber carried on aeronautical experiments with gliders and airplanes. His first experiments were carried on at Nice, France, and he
66 continued them there until 1904, thereafter transferring his location to an Army post at Chalais-Meudon. In 1904 Ferber published a booklet entitled "The Progress of Aviation since 1901 by Gliding Planes", and in 1906 his second publication, entitled "The Progress of Aviation by Gliding Planes—Step by Step, Jump by Jump, Flight by Flight", made its public appearance.

We discuss these publications and what followed their introduction somewhat in extenso, because not only the defendant emphasizes their importance as a defense, but the United States District Court for the Eastern District of New York, 56 Fed. (2d) 393, in an opinion holding plaintiff's patent rights to a narrow and restricted scope, afterwards affirmed by the Circuit Court of Appeals for the Second Circuit, likewise accorded them determinative weight, which we believe under the record before us and the principles of patent law we cannot follow.

Captain Ferber was a very distinguished and capable pioneer in the art of aviation. His 1904 booklet is a very comprehensive review of the progress of the art, setting out the contributions of well-known experimenters, including among others Lilienthal, Pilcher, Chanute, Wright brothers, Professor Langley, and other well-known persons interested in bringing into being a successful flying airplane. The book abounds in numerous illustrations of the general appearance of the structural features adopted by the experimenters mentioned and discussion of accomplishments. In this volume he does not mention the experiments of plaintiff, and as to the others, especially as to any detail of equilibrium control such as here involved, the disclosure is without merit, and valuable in the art only from a scientific standpoint as to the chronological progress disclosed in its evolution from gliders to motor-propelled planes. This booklet as we view it possesses no probative value in an effort to establish anticipation in this case.

Ferber's 1906 edition is precisely in accord with its title, a continuation of the series of events and progress made in the develop-

ment of the art, copiously illustrated and generally descriptive. Both publications disclose and describe an airplane, as finding XL shows, having a front elevator and triangular "focs" or jibs located at the opposite extremities of one of the supporting plane surfaces. These jibs were mounted to turn on a vertical axis and when turned acted to increase the resistance of that end of the plane, thereby having a directional steering function. In neither of said publications is there any description of the means by which said "focs" or "jibs" were controlled, and no disclosure whatever of the operating means or mechanism for controlling the longitudinal or lateral equilibrium of the planes. We have searched with the utmost care to discover wherein either publication in any way teaches or instructs those skilled in the art any concept of plaintiff's invention. We think they do not, and that finding XL is amply sustained by the record. What we have just said is confirmed in fact by the proceedings of the defendant exemplified by the taking of testimony in France. The belated depositions taken some twenty-five years after the event, so far as directed to an attempt to establish knowledge upon the part of plaintiff of Captain Ferber's work in France prior to his invention date, i. e., January 19, 1907, are admis-
67 sible; such knowledge of course would preclude the possibility of his believing he was the first and original inventor of the invention claimed.

The depositions, however, went further into the subject matter, and from the discussion of the Ferber defense as it appears in both the opinions of the District and Court of Appeals of New York, cases cited supra, we infer consideration was given this testimony wherein the witnesses amplified the prior publications of Ferber in the way of detail recitals of the structural features of Ferber's planes. Judicial precedent precludes the consideration of such evidence offered for that purpose. The authorities are numerous and to the precise point.

Section 4923, Revised Statutes, provides as follows:

"Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been known or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication."

In Milburn Co. v. Davis Co., 270 U. S. 390, 400, the Supreme Court in deciding the effect of the foregoing statute, said:

"* * * and by the words of the statute a previous foreign invention does not invalidate a patent granted here if it has not been patented or described in a printed publication. Rev. Sts. Sec. 4923. See Westinghouse Machine Co. v. General Electric Co., 207 Fed. 75", and in the Westinghouse case referred to in the opinion the court said:

"* * * Section 4923 deals specifically with the effect of knowledge and use in a foreign country, and it makes no distinction whether such use is made or such knowledge is acquired by persons who, after using the thing or acquiring the knowledge, remain abroad or come here. This section (4923) provides that the patent taken out by an applicant for the same thing here shall not be void on account of such knowledge or use unless the invention had been patented or described in a printed publication. As we construe this section, reduction to practice in a foreign country can never operate to destroy a patent applied for here, however widely known such reduction to practice may be, either among foreigners or among persons living here, unless the invention be patented or described in a printed publication. To that extent section 4923 qualifies the language of section 4886, which without such qualification might well lead to a different result."

The probative value of prior publications is to be found in precisely what the publications state. If the articles relied upon describe the invention "in full, clear, and intelligent terms as to enable persons skilled in the art to comprehend it, and reproduce the article claimed, without assistance from the patent", manifestly priority of invention is established. The Circuit Court of Appeals for the Southern District of New York, in the case of Badische Anilin & Soda Fabrik v. Kalle et al., 104 Fed. 802, 808, used this significant language.

"Nor would the knowledge or experience of any number of chemists (unpublished to the world) that the phrase was 'erroneous', or 'a mistake', or 'an interpolation' change the situation.

68

The 'description in a printed publication' of the statute is to be found within the four corners of such printed publication. Judge Coxe tersely and accurately expresses the law and the reason for it in the following passage:

"'The question is, What does the prior publication say? not what it might have said, or what it should have said. If prior patents and publications can be reconstructed by extrinsic evidence to fit the exigencies of the case, the inquiry will no longer be confined to what the publication communicates to the public, but it will be transferred to an endeavor to ascertain what its author intended to communicate.'"

In the case of Permutit Co. v. Wadham, 13 Fed. (2d) 454, 456, the Circuit Court of Appeals for the Sixth Circuit said:

"Such publications cannot be effectively supplemented by proof that foreign devices which are now said to be the embodiments of the publications were actually constructed at the time and did successfully perform. Such proof is self-destructive. There can be no need for it unless upon the theory that the actual construction shows precisely what was intended by the published description; and, if the description is ambiguous enough to need this kind of support, it is fatally deficient."

Additional authorities are available; we will forego their citation. The rule is so firmly established and the reason for it so apparent that we experience little hesitancy in saying that the prior publications of Captain Ferber as a matter of fact fall so far short of establishing anticipation and fail so perceptibly to establish prior knowledge of his work upon the part of the plaintiff, that the evidence offered served only to delay a final determination of this case. From the present record it is our opinion that the Ferber defense is vulnerable in the respects noted and does not supply a basis either of anticipation or to in any way enlighten the court as to the operating means employed for controlling the longitudinal and lateral equilibrium of his planes. The fact that Ferber succeeded in flying an airplane, and was the first aviator to do so in a foreign country, does not in the light of the record before us disclose more than the possession of some general means for controlling the organs of equilibrium, and leaves us without knowledge as to his mechanism. The issue presented to this court is limited to an alleged invention for controlling the longitudinal and lateral equilibrium of an airplane separately from steering control when the same is disturbed, by a single instrumentality taking the form of a vertical lever and known as the "joy stick."

The Bleriot Defense

Defendant also contends that Louis Bleriot, a French experimenter and manufacturer of airplanes, was the inventor of the "joy stick" control, as exemplified by plaintiff's patent. This contention is predicated upon a letter written to Armengaud, the patent attorney for Esnault-Pelterie, by P. A. Vautrin who constructed an airplane for Bleriot, which letter and sketch accompanying the same are set forth in finding XLIII. The letter was written on February 10, 1911. Reference is also made to an agreement prepared and
69 signed by Esnault-Pelterie and Bleriot on November 1, 1911. The preamble of this agreement contains the following recital:

"In consequence of claims made by Mr. Esnault-Pelterie against Mr. Bleriot, relative to his single bell lever, Mr. Bleriot has been able to prove to Mr. Esnault-Pelterie that he was in prior, legitimate, and personal possession of the invention—that is to say, of the single lever mounted on a cardan joint—by proofs accepted by Mr. Esnault-Pelterie."

The expression in this contract, "in prior, legitimate, and personal possession of the invention" is a phrase peculiar to the French patent law. It indicates the secret possession of knowledge legitimately obtained and is not an admission of priority of invention. Neither the Vautrin letter of February 10, 1911, with its sketch, nor the contract between Esnault-Pelterie and Bleriot under date of November 1, 1911, is indicative in any manner to show what knowledge, if any, the plaintiff Esnault-Pelterie had of Bleriot's work on January 19, 1907, the effective filing date of the patent in suit. The

defense is without merit to establish previous invention, and for the additional reason stated in finding XLVI.

The prior art cited by the defendant, in our opinion, signally fails to establish anticipation, and if we are correct in our consideration of the subject there is not a single art structure in the record disclosing a mechanical device where the entire equilibrium of an airplane may be controlled with a single instinctive tilt of a single control stick in any direction, causing the plane to tilt in a similar direction.

Plaintiff's mechanical structure accomplished what had not theretofore been accomplished. The mechanism patented supplied precisely what the art at the time and in many respects needed. It is, we think, not to be challenged for lack of novelty or restricted to a narrow scope because of its simplicity when, as we believe, it was not only adaptable to existing airplanes of varying types but actually installed therein and continuously used.

Plaintiff was experimenting in an art that exacted a high degree of scientific knowledge. That he was capable and efficient is not denied, and to bring his conception of a control device into operation and adapt it to heavier-than-air flying machines exacted more than mere mechanics, for unlike mechanisms stationary in character plaintiff in making his invention had to possess the knowledge requisite to an understanding of the elements of the air, the various means and instrumentalities employed to engage or combat them and thereby attain successful flight. No one would now say that a horizontal elevator, constructed and attached to an airplane as it is now, involved no more than mechanical skill, because it must have been known that a successful airplane would of necessity have to ascend and descend. From the beginning the question of an efficient control of the various elements for maintaining the attitude of an airplane was an important and indispensable one.

Of course, plaintiff's system was an improvement over prior ones. Most patents, we may safely say, are for improvements. De Forest's basic radio tube can scarcely be identified when compared with improved ones. Future development attended Edison's incandescent lamp, and plaintiff's patented system embodied in his device was likewise a forward step adapted to secure control of the essential elements of an airplane established and recognized as scientifically adapted to obtain flight.

Common knowledge obtained by sight alone discloses that an airplane in taking off tilts in some degree and that prudent pilots do not obtain altitude precipitously. Descents and landings are not accomplished save by resort to equilibrium controls, and while a plane may maintain its attitude under some conditions without resort for a considerable time to equilibrium controls, it is manifest that no airplane, however constructed, would even so much as leave the ground without their presence, and in addition to this it exacted

considerable time and effort to finally create a mechanism that would successfully function to actuate the control organs, and add to the safety of flight.

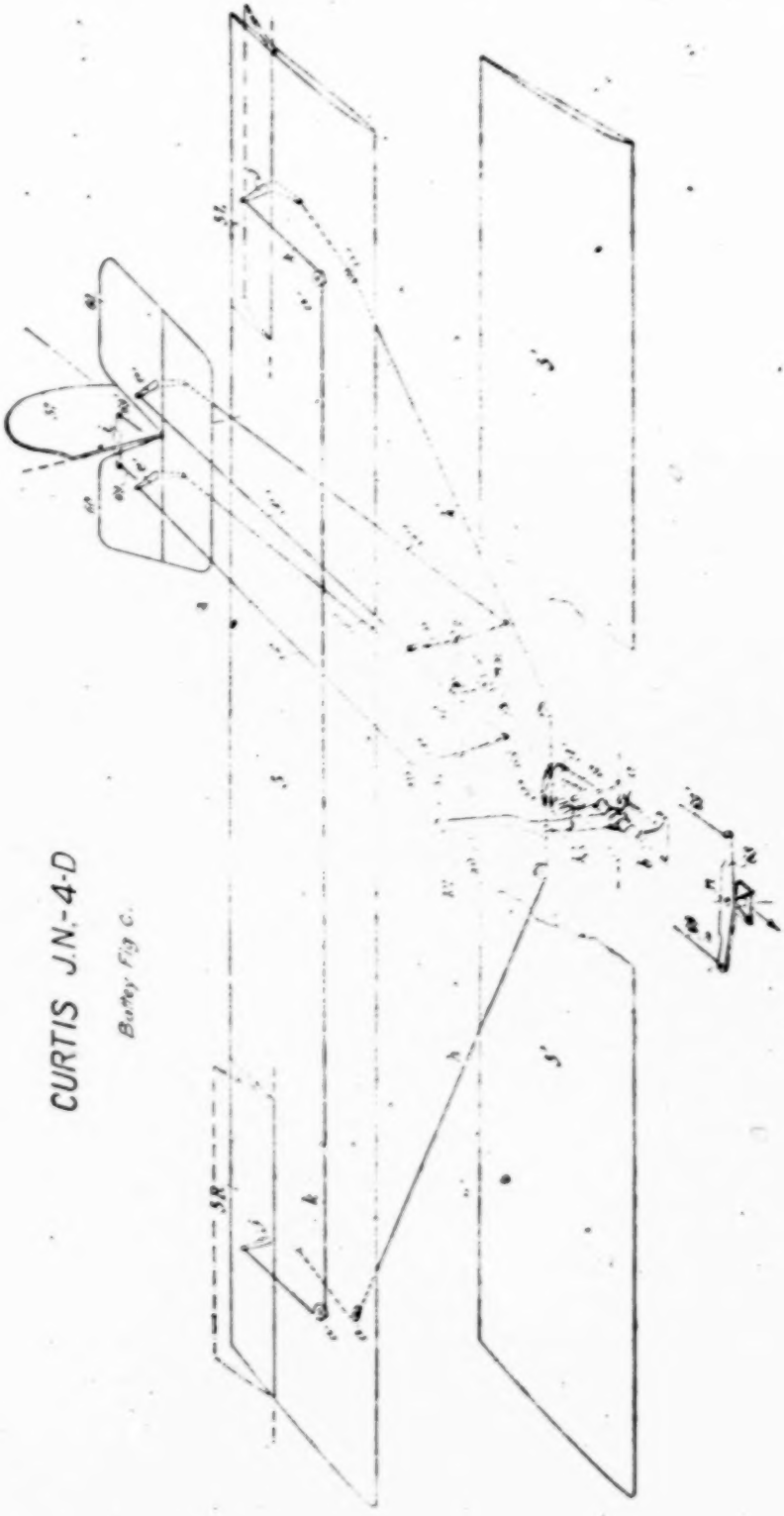
The system which we believe the plaintiff invented combined simplicity of operation with natural laws of gravitation and introduced into the art a safe, effcient, and scientifically constructed mode of control, not theretofore in use or invented, and all that remains is to discuss the issue of infringement.

Infringement

Three types of airplanes, known respectively as the Curtiss, De Haviland, and Loening, are alleged to infringe the patent in suit. (See finding XIX.) As set forth in detail in our findings XXI and XXII, all three of these types of airplanes in general possess a single vertical control lever or "joy stick" universally mounted at its lower end so that it is capable of moving or tilting in any direction. A transverse movement of this lever operates a hinged portion of the wings of the airplane so that the contour of the wing surfaces is distorted or altered for the specific purpose of controlling the lateral equilibrium of the plane. Manipulation of the "joy stick" or lever in a fore-and-aft direction controls a rudder or rudders pivoted on a horizontal action in such a manner as to control the longitudinal equilibrium of the airplane. In all of the Government structures the connections existent between the "joy stick" and the control surfaces of the airplanes are of such a character as to cause the airplane to tilt in the same direction as the tilt of the stick, and the response of the airplane is thus in accord with the instinctive balancing sensations of the pilot.

All of the Government structures possess a separate lever (foot operated) for controlling the steering rudder. For the purpose of making the Government construction clear we reproduce on the following page one of the exhibits in the case which illustrates the Curtiss construction. The structure of the De Haviland airplane and the Loening airplane is functionally the same as the Curtiss and in construction of details substantially similar to this illustration.

Referring to this illustration, a sidewise movement of the "joy stick" 61 operates through the cables hh' which are connected to hinged portions of the ends of the upper wing 5, known in the art as ailerons. Manipulation of these ailerons causes a change in contour, or a distorting of the ends of the wing. As we have already stated in our opinion, "The original process of wing warping
72 has been generally if not universally superseded by ailerons, which are concededly direct mechanical equivalents for wing warping. (See Wright Co. *v.* Herring-Curtiss Co., 204 Fed. 597, 607, 608, later sustained by the Circuit Court of Appeals, second circuit. See 211 Fed. 654.)"


CURTIS J.N.-4-D
Burley Fig C.

A fore and aft movement of the "joy stick" 61 operates, through lever arms e e and the cables connected thereto, to raise or lower the horizontal equilibrium control rudders 60, 60. The separate foot lever 68 controls the steering rudder 57 by means of cables.

The terminology of the claims in suit is found to apply to the Government structures word for word and element by element.

Defendant attempts two defenses with respect to the question of infringement. In the first defense it is suggested that the Government does not infringe due to the fact that the claims of the patent in suit use the word "stability." In this connection we quote claim 6 as an example of this use:

"6. In an aeroplane, the combination of means for producing lateral *stability*, means for producing longitudinal *stability*, means for steering in a horizontal plane, a single vertical lever movable in every direction for operating both said means for producing lateral *stability* and said means for producing longitudinal *stability*, and separate means for operating said steering means. [Italics ours.]

Defendant alleges that "stability" is that property of an object which enables it to return to its original position if it is disturbed, and states that "in modern airplanes that is accomplished by the fixed stabilizer in the case of longitudinal stability and by the dihedral angle of the wings in the case of lateral stability. These are parts of the structure, built into the machine and producing inherent automatic stability. The stabilizer and the dihedral are not subject to the manipulation of the joy stick. The latter is not in combination with them. Thus, the modern structures do not read on the claims." In other words, the Government urges that the modern airplane is self-balancing and is not dependent upon equilibrium "joy stick" control to preserve its proper attitude. Much testimony has been presented by various of defendant's experts as to the self-flying properties of the modern airplane. This argument, however, is to a certain extent fallacious as the three types of airplanes alleged to infringe cannot by any means be considered as modern, nor is it at all certain that they possessed this so-called self-flying property stressed by the defendant. As a matter of fact, Captain Hegenberger, one of defendant's expert witnesses, was asked specifically about the Curtiss JN–4. The question and his answer are as follows:

"Q. How about the JN–4? Has every plane of that type that you have flown had such inherent stability that you could fly it hands off?

"A. The JN–4 longitudinally bordered on instability."

In the second place, if an airplane can be designed to fly itself, why is it necessary to spend so much time instructing aeronautical pilots in the art of blind flying, as has been brought out by defendant's experts? If an airplane gets in a fog bank or a cloud and has this alleged property of flying itself by automatic inherent stability built into the plane, why does the pilot not

release the controls and let the plane fly itself? In fact why use the controls at any time?

The final answer to all this argument is entirely obvious. A patentee has the right to be his own lexicographer, and any court will unhesitatingly accept a definition of a word or phrase used by the patentee if it is ascertainable from the patent. It is no defense to a charge of infringement of an apparatus or a combination described in the claim in a patent that some part of it was misnamed therein by the patentee, or that the infringer has called it by a different name. (See Advance Rumley Co. v. John Lauson Mfg. Co., 275 Fed. 249; Century Electric Co. v. Westinghouse Elec. & Mfg. Co., 191 Fed. 350, 366.)

From the patent in suit it is entirely clear that by "stability" the patentee means what we have termed "equilibrium" or "equilibrium control" throughout this opinion.

The three alleged infringing planes of the Government all possess the single vertical lever movable in every direction for controlling the lateral or longitudinal equilibrium of the plane connected to controlling surfaces having the same functional effects as those disclosed in the patent, and the Government cannot escape infringement on the rather remarkable theory that the Government planes fly themselves.

The second defense theory advanced by defendant as to noninfringement is that the claims, if valid, should be limited to a combination comprising a single integral or unitary tail structure, and should not cover the tail structure such as is present in the Government airplane alleged to infringe, and which comprises an independent horizontal and vertical rudder.

It is of course well settled that the courts, in order to save the patentee from the invalidation of a claim, due to prior art or a prior use, will frequently put a narrow construction on a claim so as to conform it to the exact disclosure of the specification, and thus save the claim from invalidity. This is not necessary in the case at bar. As we have already indicated in our consideration of the rather voluminous prior art cited by defendant, there is nothing in the prior art which is of an anticipatory nature. The mere fact that the plaintiff elected in the patent in suit to disclose his equilibrium control lever and the separate steering lever connected to a particular kind of a tail structure should not limit the claims to use of that of an integral vertical and horizontal rudder structure. It is the controlling means or lever which is the essence of the invention at issue, as defined by the claims, and not the tail structure of the airplane. The only difference between the elevator and rudder of the Government structures and the elevator and rudder of the ring-tail embodiment disclosed in the patent in suit is that the former has separate mountings to the fuselage, while the latter has a single mounting to the fuselage. In each case the steering rudder and elevator possess similar functions.

There is some testimony in the case on behalf of the defendant as to what may be termed "cross responses." The theory of this is that

the mounting of the integral tail structure of the patent in suit is such as to cause the steering rudder control means to affect the equilibrium of the plane and the equilibrium control of the plane
74 to affect the steering control, and therefore certain claims do not properly find foundation in the specification of the patent in suit for steering means "separate" from equilibrium controlling means. There is no merit to this argument.

On July 16, 1931, plaintiff caused certain flights to be made at Amityville, Long Island, with a plane having a tail structure of the ring-tail type similar to that disclosed in the patent in suit. The facts as found in Finding XVII with respect to these flights were that the steering and stabilizing levers were mechanically separate and independent and each lever performed its own function, regardless of the manipulation of the other lever.

Also, in certain tests made by defendant of an airplane having a ring-tail structure it was found that when the ring-tail structure was restrained the cross responses were ngligible. (See finding XVI (c).) Such restraining of the ring-tail structure from side swing is in accordance with the disclosure of the patent in suit, which specifically refers to horizontal and vertical rudders. (See finding XV.)

Even without such restraining, such cross response as is present does not impair the operativeness of either the steering control lever or the equilibrium control lever, and each lever performs its own function regardless of the position of the other lever.

In conclusion we hold that the pat it is valid and has been infringed by the defendant. Plaint is therefore entitled to recover. Pursuant to an agreement of the parties it is ordered that the case be remanded and referred to Commissioner Gordon to take testimony upon the question of reasonable and entire compensation, and report to the court.

Whaley, Judge; Williams, Judge; Littleton, Judge; and Green, Judge, concur.

75 VII. *Judgment*

At a Court of Claims held in the City of Washington on the 24th day of January, A. D., 1936, judgment was ordered to be entered as follows:

Upon the special findings of fact, which are made a part of the judgment herein, the court decides as a conclusion of law that the plaintiff's patent is valid and has been infringed by the United States and that he is entitled to compensation therefor under the act of June 25, 1910, 36 Stat. 851, as amended by the act of July 1, 1918, 40 Stat. 705, and Section 155 of the Judicial Code.

76 [Clerk's certificate to foregoing transcript omitted in printing.]

(Endorsement on cover:) File No. 40517. Court of Claims. Term No. 963. The United States, Petitioner, vs. Robert Esnault-Pelterie. Petition for a writ of certiorari and exhibit thereto. Filed April 24, 1936. Term No. 963 O. T. 1935.

U. S. GOVERNMENT PRINTING OFFICE: 1936

Order allowing certiorari. Filed June 1, 1936

The petition herein for a writ of certiorari to the Court of Claims is granted. And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

76744—36

INDEX

	Page
Opinion below	1
Jurisdiction	1
Questions presented	2
Statutes involved	3
Statement	3
Specification of errors to be urged	5
Reasons for granting the writ	7
Appendix	18

CITATIONS

Cases:	
Barnes Automatic Sprinkler Co. v. *Walworth Manufacturing Co.*, 60 Fed. 605	11
Blake v. *San Francisco*, 113 U. S. 679	9
Cramer Manufacturing Co. v. *Nims Pump Co.*, 9 F. (2d) 214	13
Dwight & Lloyd Sintering Co. v. *Greenawalt*, 27 F. (2d) 823	13
Esnault-Pelterie v. *Chance-Vought Corp.*, 56 F. (2d) 393; 66 F. (2d) 474	7, 10, 11, 16
Fulton Co. v. *Powers Regulator Co.*, 263 Fed. 578	15
Holland Furniture Co. v. *Perkins Glue Co.*, 277 U. S. 245	12
James v. *Campbell*, 104 U. S. 356	13
Knox v. *Quicksilver Mining Co.*, 4 Fed. 809	15
Olmstead v. *Andrews*, 77 Fed. 835	11
Pennsylvania R. Co. v. *Locomotive Co.*, 110 U. S. 490	10
Railway Co. v. *Sayles*, 97 U. S. 554	13
Sargent v. *Hall Safe & Lock Co.*, 114 U. S. 63	12
Smith v. *Magic City Club*, 282 U. S. 784	15
Snow v. *Lake Shore and Michigan Southern Ry. Co.*, 121 U. S. 617	12
Toledo Scale Co. v. *Computing Scale Co.*, 9 F. (2d) 823	11
Underwood v. *Gerber*, 149 U. S. 224	11
Webster Electric Co. v. *Splitdorf Electrical Co.*, 264 U. S. 463	13
Westinghouse Electric & Manufacturing Co. v. *Metropolitan Electric Mfg. Co.*, 290 Fed. 661	15
Wollensak v. *Sargent*, 151 U. S. 221	10, 11
Statutes:	
Act of June 25, 1910, as amended by Act of July 1, 1918 (U. S. C., Title 35, sec. 68)	20
Judicial Code, sec. 155 (U. S. C., Title 28, sec. 261)	21
Revised Statutes:	
Sec. 4886 (U. S. C., Title 35, sec. 31)	18
Sec. 4887 (U. S. C., Title 35, sec. 32)	18
Sec. 4923 (U. S. C., Title 35, sec. 72)	19

In the Supreme Court of the United States

OCTOBER TERM, 1935

No. —

UNITED STATES OF AMERICA, PETITIONER

v.

ROBERT ESNAULT-PELTERIE

PETITION FOR A WRIT OF CERTIORARI TO THE COURT OF CLAIMS OF THE UNITED STATES

The Solicitor General, on behalf of the United States of America, prays that a writ of certiorari issue to review the interlocutory judgment of the Court of Claims of the United States entered in the above cause on January 24, 1936.

OPINION BELOW

The opinion of the Court of Claims is not yet reported.

JURISDICTION

The interlocutory judgment of the Court of Claims was entered January 24, 1936. The jurisdiction of this Court is invoked under Section 3 (b) of the Act of February 13, 1925.

QUESTIONS PRESENTED

1. Whether the patent in suit may be construed to cover a single lever for controlling the equilibrium of an airplane, or whether it should be construed as being limited to a combination comprising a lever and a single integral or unitary tail structure of an airplane.

2. If the patent in suit may be construed to cover a single lever for controlling the equilibrium of an airplane, whether such a device was patentable over prior disclosures.

3. Whether the patent in suit covers a device that was patentable over respondent's French patent, No. 372753, which was applied for more than a year prior to the filing in this country of the application for the patent in suit.

4. Whether the patent in suit, application for which was filed in this country on January 16, 1908, is invalid by virtue of the fact that the claims alleged to cover the single control lever here involved were not inserted in the application until June 12, 1913; the control lever, during the intervening period, having come into general use in the United States, and having been described in printed publications.

5. Whether the respondent, by acquiescing in the rejection by the examiner of patents of claim 13, is estopped from contending that the claims of the patent in suit should be construed to cover a single lever for operating the means for controlling the equilibrium of an airplane.

6. Whether the patent in suit is invalid by virtue of the fact that its claims, if construed to embrace a single equilibrium control lever, are not supported by its disclosure.

7. Whether the patent in suit is invalid by virtue of the fact that the control lever alleged to be covered by it was in public use in France prior to the date of its alleged invention by the respondent.

8. Whether the claims of the patent in suit were infringed by the United States.

STATUTES INVOLVED

The statutes involved will be found in the Appendix, *infra,* pp. 18–21.

STATEMENT

This suit was brought by the respondent, Robert Esnault-Pelterie, a citizen of France, against the United States in the Court of Claims to recover compensation for the use of an airplane control device said to be covered by United States Patent No. 1115795 issued to respondent on November 3, 1914. This device consists of a universally pivoted vertical lever, known as a joy-stick, utilized for controlling the longitudinal and transverse equilibria of airplanes and so connected that the tilt of the airplane follows the tilt of the stick. The device is generally employed in all but the heavier types of airplanes in use by both the Army and the Navy. Finding XLVII.

The court below found that at least one of each of three types of airplanes, Curtiss *JN-4D,* DeHavi-

land *DH–4B,* and Loening monoplane *M–81* was manufactured for and used by the United States without license or permission from the respondent (Finding XIX), and it was stipulated between the parties that proof of the manufacture for or use by the United States of any airplanes other than these three might be deferred until after an adjudication of the questions of validity and infringement of the patent in suit. Finding XXIII. The control systems of the Curtiss, DeHaviland, and Loening planes referred to are substantially the same.

These planes are steered directionally by a rudder which is controlled by a centrally pivoted horizontal rudder bar or lever situated directly in front of the pilot and in position for actuation by the pilot's feet. The longitudinal attitude of the planes is controlled by a tail surface, pivoted on a horizontal axis and generally known as the "elevator", which by being turned up or down causes the airplane to ascend or descend, as required. The lateral attitude is controlled by hinged segments of the wings, generally known as ailerons. The latter are turned up or down, as the case may be, in order to cause the airplane to tilt or "bank" to one side or the other as desired. The vertical lever known as the joy-stick, claimed to infringe the patent in suit, is located near the pilot's seat and is manually operated. It is capable of movement in all directions, and is so connected with the ele-

vator and the ailerons that by a fore-and-aft motion it actuates the elevator, by a side-to-side motion it actuates the ailerons, and by an oblique movement it affects both the ailerons and the elevator simultaneously. When the joy-stick is moved forward the airplane noses down; when it is moved rearwardly the airplane noses up; when the lever is moved to the right, the plane rolls to the right; when it is moved to the left the plane rolls to the left; and when the lever is moved to any intermediate position a consequent movement of the airplane will be produced corresponding relatively to the degree of inclination and the direction of movement of the lever. Findings XXI and XXII.

The respondent in this suit relies upon claims 2 and 5 to 9, inclusive, of his Patent No. 1115795. These claims are set out in Finding IX.

The court below on November 4, 1935, filed special findings of fact, and on January 24, 1936, it directed the entry of an interlocutory judgment, holding that the respondent's patent is valid and has been infringed by the United States, and that the respondent is entitled to compensation under the Act of June 25, 1910, as amended by the Act of July 1, 1918. An interlocutory judgment was entered accordingly.

SPECIFICATION OF ERRORS TO BE URGED

The Court of Claims erred:

1. In holding that the patent in suit covers a single control lever that was patentable over prior disclosures.

2. In failing to hold that the claims of the patent in suit should be construed as being limited to a combination comprising a lever and a single integral or unitary tail structure of an airplane.

3. In holding that the patent in suit covers a device that was patentable over respondent's French patent, No. 372753, applied for on December 19, 1906, and issued on February 28, 1907.

4. In failing to hold that the patent in suit was invalid by virtue of the fact that although the application therefor was filed on January 16, 1908, the claims alleged to cover the single control lever here involved were not inserted into the application until June 12, 1913; the control lever, during the intervening period, having come into general use in the United States, and having been described in printed publications.

5. In failing to hold that respondent was estopped, by acquiescing in the rejection by the examiner of patents of claim 13, from contending that the claims of the patent in suit should be construed to cover a single lever for operating the means of controlling the equilibrium of an airplane.

6. In failing to hold that the patent in suit, if construed to embrace a single control lever, is invalid by virtue of the fact that its claims are not supported by its disclosure.

7. In failing to hold that the patent in suit, if construed to embrace a single control lever, is invalid by virtue of the fact that the control lever

alleged to be covered by the patent was in public use in France prior to the date of its alleged invention by the respondent.

8. In holding that the claims of the patent in suit were infringed by the United States.

REASONS FOR GRANTING THE WRIT

1. The Court of Claims in this case and the Circuit Court of Appeals for the Second Circuit in *Esnault-Pelterie* v. *Chance Vought Corporation,* 66 F. (2d) 474, have rendered conflicting decisions on the validity and construction of the patent in suit and its infringement by modern airplane control levers. In the *Chance-Vought* case the Circuit Court of Appeals, in affirming the decision of the District Court for the Eastern District of New York (56 F. (2d) 393) held (pp. 477, 478) that, in view of the prior art, there was no novelty in the use of a single vertical lever capable of movement in any direction to operate two or three controls, or in determining, as an engineering problem, the choice as to which of the three controls should be operated by the single lever; that the patentee of the patent in suit may not claim invention in the asserted instinctive use by the operator of the control lever; that the patent should be narrowly construed as limited to the integral vertical and horizontal rudder structure disclosed in respondent's patent employing the so-called bird tail or ringtail unit for control, with a restricted

range of equivalents; and that, as so construed, the patent was not infringed by the airplane of the defendant in that suit. In the case at bar, the court below held that the patent should not be limited to the integral vertical and horizontal rudder structure of the bird tail or ringtail unit, but should be broadly construed as covering a single vertical control stick whereby the entire equilibrium of an airplane may be controlled with a single instinctive tilt of the control stick in any direction, causing the plane to tilt in a similar direction; and that as so construed the patent was valid and was infringed by the airplanes of the United States using such a control stick. The airplane involved in the *Chance-Vought* case and those involved in the present case employed the single control lever. The construction and function of the lever were the same in each instance.

2. The questions of the validity and construction of the patent in suit and its infringement by modern airplane controls are of momentous importance both to the Government and to the entire aircraft industry, due to the extensive use of the control lever. In view of the conflict of opinion between the Court of Claims and the Circuit Court of Appeals for the Second Circuit, as to whether the patent in suit covers such a control lever, a final adjudication should be had by this Court. The amount involved in this suit alone is very large, as it is assumed that on the accounting the

respondent would claim a royalty on the great majority of airplanes used by the Government during the period commencing six years prior to the institution of the action and the expiration of the patent. This suit has been pending for a number of years.

3. The petition for a writ of certiorari is presented at this stage of the case—after an entry of an interlocutory judgment holding the patent valid and infringed—rather than after final judgment, since, if this Court should grant the writ and reverse the decision of the court below, prolonged and costly accounting proceedings may be avoided.

4. It is submitted that the decision of the Court of Claims is erroneous, for a number of reasons.

(a) The single lever for controlling the longitudinal and transverse equilibrium of an airplane alleged to be covered by the patent in suit does not constitute a patentable invention. The use of a single lever mounted on a universal joint and capable of movement in all directions for the purpose of controlling the action of different mechanisms, was well known at the time that the patentee claims to have made his invention. (See patents to Wadsworth, Weeber, Wilson, and Simpson, described in Findings XXIV, XXXII, XXXIII, XXXVI, and XXXVII.) This Court has frequently held that it does not constitute invention to take a well-known device and put it on a new type of apparatus. *Blake* v. *San Francisco,*

113 U. S. 679, 682; *Pennsylvania Railroad Co.* v. *Locomotive Co.*, 110 U. S. 490; *Wollensak* v. *Sargent*, 151 U. S. 221, 227. The use of levers in airplanes for control purposes was likewise old. (See French patent to Laroze; French patent to Penaud and Gauchot; British patent to Davidson; French patent to Macedo; German patent to Schussler; German patent to Jung and British patent to Quentin, all of which are summarized in Findings XXIV, XXVIII, XXV, XXVI, XXVII, XXIX, XXX, and XXXV.) On this point the Circuit Court of Appeals stated in *Esnault-Pelterie* v. *Chance Vought Corporation*, 66 F. (2d) 474, 478:

> There is no novelty in the use of a lever to operate two or three controls, or in determining, as an engineering problem, the choice as to which of the three controls should be operated by a single lever.

The Court of Claims, moreover, indicated that the fact that, in its opinion, the control lever operated in a manner that it called instinctive, was a reason for holding that the device was the product of inventive genius, and, therefore, the proper subject of a patent. This suggestion was discussed in detail by the Circuit Court of Appeals and repudiated, 66 F. (2d) 477.

(b) The plaintiff obtained three French patents. His first French patent was issued on February 28, 1907, as the result of an application filed on December 19, 1906 (Finding III). The application

for the patent in suit was filed in the United States on January 16, 1908, more than twelve months subsequent to the French filing date. Consequently, under Section 4887 of the Revised Statutes (U. S. Code, Title 35, Sec. 32), *infra* p. 18 the plaintiff was barred from receiving a patent in this country on the invention covered by his first French patent. The patent in suit may, therefore, be sustained only if, and in so far as, it claims a structure that is patentable over the 1906 French patent. The latter disclosed two horizontal levers, one of which was movable in all directions, employed for the purpose of manipulating the control surfaces of an airplane. Finding IV. The patent in suit shows two vertical levers used for that purpose. The principal difference in the two structures is the difference in position between the two levers—one horizontal, the other vertical. We submit that it was not invention to transpose the horizontal stick to a vertical position. *Wollensak* v. *Sargent, supra; Underwood* v. *Gerber,* 149 U. S. 224; *Olmstead* v. *Andrews & Co.,* 77 Fed. 835; *Toledo Scale Co.* v. *Computing Scale Co.,* 9 F. (2d) 823, 824; *Barnes Automatic Sprinkler Co.* v. *Walworth Manufacturing Co.,* 60 Fed. 605, 607. Both the District Court and the Circuit Court of Appeals in the *Chance-Vought* case so held on this point, 56 F. (2d) 395; 66 F. (2d) 475, 477, 478.

(c) The claims, even if valid, should be limited to a combination comprising a single integral or

unitary tail structure. The specification forming a part of the respondent's patent discloses a structure in which the tail surfaces, instead of comprising a separate elevator and a separate rudder, as is the case with all modern airplanes, consists of a single integral or unitary structure to be used both as an elevator and as a rudder, according to the direction in which it is manipulated by the control levers. The Circuit Court of Appeals in the *Chance-Vought* suit held that, in the light of the prior art, the claims of the respondent's patent in no event could be permitted to read broadly on the modern vertical control lever, but at best should be limited and restricted to a combination of the control levers with an integral or unitary tail structure, 66 F. (2d) 478. This Court has not infrequently placed a narrow construction on and limited patent claims so as to conform them to the exact disclosure, in order to save them from being declared entirely invalid. *Sargent* v. *Hall Safe & Lock Co.*, 114 U. S. 63; *Snow* v. *Lake Shore and Michigan Southern Railway Co.*, 121 U. S. 617, 629; *Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, 256. On this point there is a direct conflict between the Court of Claims in this case, and the Circuit Court of Appeals in the *Chance-Vought* case.

(d) The respondent filed his application for Letters Patent in this country on January 16, 1908. The patent was issued on November 3, 1914. The

claims alleged to have been infringed were inserted into the application by amendment on June 12, 1913 (Finding VIII). During a part of the period intervening between January 16, 1908, and June 12, 1913, the application contained no claims covering the control lever. Yet during that period the device came into general use in this country (Finding XXXVIII, paragraphs 1 and 2). We submit that these facts rendered the patent invalid. *Railway Co.* v. *Sayles,* 97 U. S. 554, 563–564; *James* v. *Campbell,* 104 U. S. 356, 370; *Webster Electric Co.* v. *Splitdorf Electrical Co.,* 264 U. S. 463, 465; *Cramer Manufacturing Co.* v. *Nims Pump Co.,* 9 F. (2d) 914; *Dwight & Lloyd Sintering Co.* v. *Greenawalt,* 27 F. (2d) 823, 830.

(e) The court below should have held that respondent was estopped from claiming that his patent covers a single control lever because of respondent's acquiescence in the rejection by the Patent Office of respondent's claim 13. Claim 13 was filed February 1, 1909, and was for "An aeroplane having means for controlling its inclination and a single lever for operating said means to control both the longitudinal and the transverse stability of the apparatus, said lever being arranged to oscillate in different vertical planes, means for transmitting its movement in one plane to the means for governing the longitudinal inclination, and means for transmitting its movement in the other plane to the means for determining

the transverse stability, said lever being mounted to permit also an oblique movement having components in each of said planes so as to actuate simultaneously the means for establishing longitudinal stability and that for establishing transverse stability." The examiner of patents on March 2, 1909, rejected the claim for alleged lack of invention over the French patent to Laroze. The respondent asked for a reconsideration of the claim, and the examiner on May 10, 1910, and again on May 27, 1911, rejected the claim, this time on the basis of the Davidson as well as the Laroze patent. On May 23, 1912, the respondent cancelled the claim. On June 12, 1913, respondent filed a new set of four claims, and on June 13, 1914, filed an additional claim. These claims were subsequently allowed as claims 5 to 9, inclusive, of the patent in suit. Finding VIII. They appear in Finding IX, and each is for a combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever.

The principle is well settled that where an applicant for a patent to cover a new combination is compelled by the rejection of his application by the Patent Office to narrow his claim by the introduction of a new element, he cannot after the issue of the patent broaden his claim by dropping the element which he was compelled to include in order to secure his patent. If the claim to a combination

be restricted to specified elements, all must be regarded as material, and limitations imposed by the inventor, especially such as were introduced into an application after it had been persistently rejected, must be strictly construed against the inventor and looked upon as disclaimers. The patentee is thereafter estopped to claim the benefit of his rejected claim or such a construction of his amended claim as would be equivalent thereto. *Smith* v. *Magic City Club,* 282 U. S. 784, 789.

(f) The patent should have been held invalid also on the ground that the claims, if construed as respondent contends they should be, are not supported by the disclosure. In other words, the specification describes one type of structure, whereas the claims alledgedly cover a device which is entirely different. It is well settled that under such circumstances the claims are invalid. *Knox* v. *Quicksilver Mining Co.,* 4 Fed. 809; *Fulton Co.* v. *Powers Regulator Co.,* 263 Fed. 578, 580; *Westinghouse Electric & Manufacturing Co.* v. *Metropolitan Electric Mfg. Co.,* 290 Fed. 661, 664. In this instance, the device disclosed in the patent consists of two levers, one to control the steering and the other for manipulating the means for maintaining longitudinal and lateral stability. The two levers are interconnected and interrelated (Finding XIV). The claims in suit purport to cover a single vertical lever to actuate the longitudinal and lateral controls. The Government's

position on this point accords with the decision of the Circuit of Appeals in the *Chance Vought* case, 66 F. (2d) 477.

(g) Prior to the date of the respondent's alleged invention, single levers mounted on universal joints and capable of movement in all directions had actually been used on airplanes for the purpose of actuating the control surfaces. This was done by Captain Ferber in 1904 and 1905 (Finding XLI), and by Bleriot, who later became famous as the first aviator to fly across the English Channel (Finding XLIII). This prior use, however, took place in France, and the court below held that in order to bar a United States patent prior public use must have taken place in this country, in view of the provisions of Revised Statutes, Section 4923, *infra,* p. 19. Undoubtedly that is the law in case of an American patentee, but the question whether R. S. 4923 should be applicable to a situation such as is presented here, where the patentee is a citizen of the foreign country where the prior use took place, has never been directly passed upon by this Court, or by any other court. It is increasingly important with the growth of modern means of communication and interchange of information.

(h) In the *Chance-Vought* case, the Circuit Court of Appeals held that the claims of respondent's patent had not been infringed by the *Chance-Vought* Corporation. The court below, differing

with the Circuit Court of Appeals as to the scope of the patent, held that the claims of the patent had been infringed by the Government. If the claims be restricted as they were by the Circuit Court of Appeals, and as we contend they should be, there can be no doubt that the Government airplanes do not infringe them.

Wherefore, it is respectfully submitted that this petition for a writ of certiorari should be granted.

STANLEY REED,
Solicitor General.

APRIL 1936.

APPENDIX

R. S., Section 4886 (U. S. C., Title 35, Sec. 31):

> Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, or who has invented or discovered and asexually reproduced any distinct and new variety of plant, other than a tuber-propagated plant, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor.

R. S., Section 4887 (U. S. C., Title 35, Sec. 32):

> No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless the application for said foreign patent was filed more than twelve months, in cases within the provisions of section 31 of this title, and four months in cases of designs, prior to the

filing of the application in this country, in which case no patent shall be granted in this country.

An application for patent for an invention or discovery or for a design filed in this country by any person who has previously regularly filed an application for a patent for the same invention, discovery, or design in a foreign country which, by treaty, convention, or law, affords similar privileges to citizens of the United States shall have the same force and effect as the same application would have if filed in this country on the date on which the application for patent for the same invention, discovery, or design was first filed in such foreign country, provided the application in this country is filed within twelve months in cases within the provisions of section 31 of this title, and within four months in cases of designs, from the earliest date on which any such foreign application was filed. But no patent shall be granted on an application for patent for an invention or discovery or a design which had been patented or described in a printed publication in this or any foreign country more than two years before the date of the actual filing of the application in this country, or which had been in public use or on sale in this country for more than two years prior to such filing.

R. S., Section 4923 (U. S. C., Title 35, Sec. 72):

Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been known

or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication.

Act of June 25, 1910, as amended by Act of July 1, 1918 (U. S. C., Title 35, Sec. 68):

> Whenever an invention described in and covered by a patent of the United States shall be used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, such owner's remedy shall be by suit against the United States in the Court of Claims for the recovery of his reasonable and entire compensation for such use and manufacture. The Court of Claims shall not entertain a suit or award compensation under the provisions of this section where the claim for compensation is based on the use or manufacture by or for the United States of any article owned, leased, used by, or in the possession of the United States prior to June 25, 1910. In any such suit the United States may avail itself of any and all defenses, general or special, that might be pleaded by a defendant in an action for infringement, as set forth in this chapter, or otherwise. The benefits of the provisions of this section shall not inure to any patentee who, when he makes such claim, is in the employment or service of the Government of the United States, or the assignee of any such patentee. This section shall not apply to any device discovered or invented by such employee during the time of his employment or service.

Judicial Code, Section 155 (U. S. C., Title 28, Sec. 261):

> Aliens who are citizens or subjects of any Government which accords to citizens of the United States the right to prosecute claims against such Government in its courts, shall have the privilege of prosecuting claims against the United States in the Court of Claims, whereof such court, by reason of their subject matter and character, might take jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE: 1936

INDEX

	Page
Opinion below	1
urisdiction	1
Questions presented	2
Statutes involved	3
Statement:	
A. Introduction	3
B. Basic problems of aviation	6
C. Airplane control apparatus	8
D. Respondent's French patents	10
E. The patent in suit	12
Specification of Errors to be Urged	17
Summary of Argument	18
Argument:	
I. The patent in suit is invalid as claiming a device not patentable over prior disclosures	21
A. Prior patents	22
B. The prior patents are in analogous arts	34
C. The device does not rise to the dignityof an invention	36
D. There is no merit in the contention that the element of invention is found in the alleged instinctive character of the operation of the control lever	38
II. The patent, if valid, should be construed as limited to a combination comprising a pair of vertical control levers with a single integral or unitary tail surface of an airplane	47
III. The vertical control lever did not constitute invention over the structure disclosed in the respondent's 1906 French patent	60
IV. The claims of the patent in suit are not supported by the disclosure	66
V. The patent is invalid by virtue of the fact that the claims on the control lever were not inserted in the application until five and one-half years after filing, while the device came into general use in the United States prior to that date	68

96019—36——1

Argument—Continued. Page

VI. The respondent, by acquiescing in the rejection of claim 13 is estopped from asserting that the claims of the patent in suit should be construed to cover the vertical control lever 76

VII. Esnault-Pelterie was not the Inventor of the Airplane Control Lever 79

VIII. The patent in suit has not been infringed by the petitioner 85

Conclusion 101

Appendix 102

CITATIONS

Cases:

Altoona Publix Theatres, Inc. v. *Tri-Ergon Corp.*, 294 U. S. 477 ..... 36, 85

Ansonia Brass and Copper Co. v. *Electrical Supply Co.*, 144 U. S. 11 35

A. Schrader's Son, Inc. v. *James Martin Corp.*, 294 Fed. 620 75

Aron v. *Manhattan Railway Co.*, 132 U. S. 84 37

Atlantic Works v. *Brady*, 107 U. S. 192 63

Barrett v. *Van Pelt*, 268 U. S. 85 85

Blake v. *San Francisco*, 113 U. S. 679 24

Brown v. *Piper*, 91 U. S. 37 35

Bush v. *Fox*, 5 H. L. C. 707 35

Carbide Corp. of America v. *American Patents Development Co.*, 283 U. S. 420 37

Carver v. *Hyde*, 16 Pet. 513 41

Church of the Holy Trinity v. *United States*, 143 U. S. 457 85

Cimiotti Unhairing Co. v. *American Fur Refining Co.*, 198 U. S. 399 ..... 85, 94

Consolidated Roller Mill Co. v. *Walker*, 138 U. S. 124 35

Cramer Manufacturing Co. v. *Nims Pump Co.*, 9 F. (2d) 914 75

Cutter Co. v. *Metropolitan*, 275 Fed. 158 69

DeForest Radio Co. v. *General Electric Co.*, 283 U. S. 664 ..... 36, 40

Eagleton Manufacturing Co. v. *West Manufacturing Co.*, 111 U. S. 490 74

Electric Cable Co. v. *Edison Co.*, 292 U. S. 69 37

Ensten v. *Simon Ascher & Co.*, 282 U. S. 445 84–85

Esnault-Pelterie v. *Chance Vought Corp.*, 56 F. (2d) 393, affirmed, 66 F. (2d) 474 ..... 5, 13, 33, 45, 46, 54, 61, 64, 82, 91

Ex parte Ross, 317 Patent Office Gazette 237 35

Ex parte Sperry, 2 U. S. Patents Quarterly 4 35

Fulton Co. v. *Powers Regulator Co.*, 263 Fed. 578 66

Grant v. *Walter*, 148 U. S. 547 37

Harwood v. *Great Northern Ry. Co.*, 11 H. L. C. 654 35

Cases—Continued. Page

Helvering v. *New York Trust Co.*, 292 U. S. 455 85
Hestonville, etc. Railway Co. v. *McDuffee*, 185 Fed. 798 75
Holland Furniture Co. v. *Perkins Glue Co.*, 277 U. S. 245 .. 40, 59, 94
In re Colman, 30 F. (2d) 1000 24
In re Endacott, 58 F. (2d) 444 35
In re Morgan, 38 App. D. C. 274 24
In re Schneider, 47 F. (2d) 970 35
In re Weingartner, 58 F. (2d) 442 24
I. T. S. Rubber Co. v. *Essex Rubber Co.*, 272 U. S. 429 78
King v. *Gallan*, 109 U. S. 99 43
Kintner v. *Atlantic Communication Co.*, 230 Fed. 829, affirmed, 240 Fed. 716 75
Knapp v. *Morss*, 150 U. S. 221 40
Knox v. *Quicksilver Mining Co.*, 4 Fed. 809 66
Kokomo Fence Machine Co. v. *Kitselman*, 189 U. S. 8 ..... 85, 94
LeRoy v. *Tatham*, 14 How. 156 40
Lovell Mfg. Co. v. *Cary*, 147 U. S. 623 24
L. Schreiber & Sons Co. v. *Grimm*, 72 Fed. 671 24
McClain v. *Ortmayer*, 141 U. S. 419 37
Mast Foose Co. v. *Stover Mfg. Co.*, 177 U. S. 485 24
Milburn Co. v. *Davis-Bournonville*, 270 U. S. 390 83
Minerals Separation Corp. v. *Magma Co.* 280 U. S. 400 37
Model Bottling Machinery Co. v. *Anheuser-Busch Brewing Ass'n.*, 190 Fed. 573 35
Morgan Envelope Co. v. *Albany Paper Co.*, 152 U. S. 425 77
Muser v. *Bell*, 278 Fed. 904 24
Olmsted v. *Andrews*, 77 Fed. 835 65
Omaha v. *United States*, 260 U. S. 178 85
Paramount Publix Corp. v. *American Tri-Ergon Corp.*, 294 U. S. 464 36
Pennsylvania Railroad v. *Locomotive Co.*, 110 U. S. 490 24
Permutit Co. v. *Graver Corp.*, 284 U. S. 52 ..... 37, 45
Powers-Kennedy Corp. v. *Concrete Co.*, 282 U. S. 175 ..... 35, 37
Railway Co. v. *Sayles*, 97 U. S. 554 73
Ransome Concrete Mach. Co. v. *United Concrete Mach. Co.*, 177 Fed. 413 35
Royer v. *Roth*, 132 U. S. 201 35
Saranac Automatic Machine Corp. v. *Wirebounds Patents Co.*, 282 U. S. 704 37
Sargent v. *Hall Sage & Lock Co.*, 114 U. S. 63 59
Smith v. *Magic City Kennel Club*, 282 U. S. 784 ..... 37, 78
Snow v. *Lake Shore & Michigan Southern Ry. Co.*, 121 U. S. 617 59
Standard Caster & Wheel Co. v. *Caster Socket Co.*, 113 Fed. 162 35
Steward v. *American Lava Co.*, 215 U. S. 161 ..... 69, 75, 84
St. Germain v. *Brunswick*, 135 U. S. 227 35

Cases—Continued. Page

Toledo Scale Co. v. *Computing Scale Co.*, 9 F. (2d) 823.... 65
Uhderwood v. *Gerber*, 149 U. S. 224..... 65
United States v. *Kirby*, 7 Wall. 482..... 85, 94
Victor Talking Machine Co. v. *Brunswick-Balke-Collender Co.*, 8 F. (2d) 41, affirmed 273 U. S. 670..... 75
Warner Instrument Co. v. *Stewart & Clark Mfg. Co.*, 185 Fed. 507..... 24
Westinghouse v. *Boyden Power Brake Co.*, 170 U. S. 537... 85
Westinghouse Electric & Manufacturing Co. v. *Metropolitan Electric Manufacturing Co.*, 290 Fed. 661..... 66
Wollensak v. *Sargent*, 151 U. S. 221..... 24
Wright Co. v. *Herring-Curtiss Co.*, 211 Fed. 654..... 7
Wright Co. v. *Pauhan*, 177 Fed. 261..... 7

Revised Statutes:
Sec. 4886 (U. S. C., Title 35, Sec. 31)..... 102
Sec. 4887 (U. S. C., Title 35, Sec. 32)..... 102
Sec. 4920 (U. S. C., Title 35, Sec. 69)..... 84
Sec. 4923 (U. S. C., Title 35, Sec. 72)..... 103
Judicial Code, Sec. 155 (U. S. C., Title 28, Sec. 261)..... 105
Act of June 25, 1910, as amended (U. S. Code, Title 35, sec. 68)..... 104

In the Supreme Court of the United States

OCTOBER TERM, 1936

No. 41

THE UNITED STATES, PETITIONER

v.

ROBERT ESNAULT-PELTERIE

ON WRIT OF CERTIORARI TO THE COURT OF CLAIMS

BRIEF FOR THE UNITED STATES

OPINION BELOW

The opinion of the Court of Claims is not yet reported (R. 38–75).

JURISDICTION

The interlocutory judgment of the Court of Claims was entered January 24, 1936 (R. 75). The petition for a writ of certiorari was filed April 24, 1936, and was granted June 1, 1936. The jurisdiction of this Court is invoked under Section 3 (b) of the Act of February 13, 1925.

QUESTIONS PRESENTED

1. Whether the patent in suit may be construed to cover a single lever for controlling the equilibrium of an airplane or whether it should be construed as being limited to a combination comprising a lever and a single integral or unitary tail structure of an airplane.

2. If the patent in suit may be construed to cover a single lever for controlling the equilibrium of an airplane, whether such a device was patentable over prior disclosures.

3. Whether the patent in suit covers a device that was patentable over respondent's French patent, No. 372753, which was applied for more than a year prior to the filing in this country of the application for the patent in suit.

4. Whether the patent in suit, application for which was filed in this country on January 16, 1908, is invalid by virtue of the fact that the claims alleged to cover the single control lever here involved were not inserted in the application until June 12, 1913; the control lever, during the intervening period, having come into general use in the United States, and having been described in printed publications.

5. Whether the respondent, by acquiescing in the rejection by the examiner of patents of claim 13, is estopped from contending that the claims of the patent in suit should be construed to cover

a single lever for operating the means for controlling the equilibrium of an airplane.

6. Whether the patent in suit is invalid by virtue of the fact that its claims, if construed to embrace a single equilibrium control lever, are not supported by its disclosure.

7. Whether the patent in suit is invalid by virtue of the fact that the control lever alleged to be covered by it was in public use in France prior to the date of its alleged invention by the respondent.

8. Whether the claims of the patent in suit were infringed by the United States.

STATUTES INVOLVED

The statutes involved will be found in the Appendix, *infra*, pp. 103–106.

STATEMENT

A. Introduction

This suit was brought by the respondent, Robert Esnault-Pelterie, a citizen and resident of France, against the United States in the Court of Claims, under the Act of June 25, 1910, as amended (U. S. Code, Title 35, Section 68), to recover compensation for the use of an airplane control lever said to be covered by United States Patent No. 1115795 issued to respondent on November 3, 1914.[1] A sec-

[1] A copy of this patent, plaintiff's exhibit 1, was by reference made a part of Finding IX of the court below (R. 13), and will be found at page 1 of the binder of exhibits which counsel have prepared for the convenience of this Court.

ond cause of action set forth in the petition is to recover compensation pursuant to an alleged implied contract for the manufacture and use by and for the United States in France between April 6, 1917, and November 11, 1918, of airplanes said to embody the inventions of the respondent's three French patents (R. 4).[2]

The device charged to infringe is a vertical lever, popularly known as a "joy-stick", mounted on a universal joint and capable of motion in all directions. It is connected with the control surfaces of the airplane, known as the "elevator" and the "ailerons", which in turn control the longitudinal and transverse attitudes of the craft. A fore and aft movement of the lever controls the "elevator", which in turn causes the airplane to ascend or descend; while a side to side movement of the lever controls the "ailerons", which in turn cause the airplane to tilt to the right or the left, as desired. The pilot manipulates the lever with his hand. It was held by the court below that Claim 2 and Claims 5-9 of the patent in suit cover the foregoing device and have been infringed. (Finding IX, R. 13, 38.) The lever is generally employed

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This binder contains in numerical order copies of all of the relevant exhibits which were made part of the findings below. The originals of the exhibits are on file in the office of the Clerk of this Court. The binder of exibits will be hereinafter referred to as "Binder."

[2] No proof was adduced in support of the second cause of action, and no recovery granted in respect thereto, so that it requires no consideration here.

in all but the heavier types of airplanes in use by the Army and the Navy (Finding XLVII, R. 37).

The court below found that at least one of each of three types of airplanes, known as Curtiss JN–4D, DeHaviland DH–4B, and Loening monoplane M–81, was manufactured for and used by the United States without the respondent's license or permission (Finding XIX, R. 22). It was stipulated that proof of the manufacture for or use by the United States of any airplanes other than these three and of any damage alleged to have resulted to the respondent, might be deferred until after an adjudication as to the questions of validity and infringement (Finding XXIII, R. 25). An interlocutory judgment was rendered adjudging the patent valid and infringed (R. 75).

The same patent was involved in the case of *Esnault-Pelterie* v. *Chance Vought Corporation* (C. C. A. 2d), 66 F. (2d) 474, affirming 56 F. (2d) 393, in which it was held that the claims of the patent should be narrowly construed as limited and restricted to the specific device disclosed in the specification, and that as so limited, the claims were not infringed by the modern airplane control lever or "joy-stick." In the instant case, on the other hand, the Court of Claims placed a broad construction on the patent and held it valid and infringed. There is thus a direct conflict between the holdings of Circuit Court of Appeals for the Second Circuit and the Court of Claims relative to the patent in suit.

B. Basic Problems of Aviation

An airplane is supported in the atmosphere through which it travels by the reaction of the air upon its wing surfaces. To secure this reaction a propeller and a motor are employed. Unlike vehicles that travel on land or water, aircraft must be controlled in three planes. Like a ship or land vehicle, its direction must be controlled by means of appropriate steering apparatus. In addition, however, it is necessary to control its longitudinal equilibrium, i. e., to cause the airplane to fly on a level or to ascend or descend; and its lateral equilibrium, i. e., to cause the airplane to fly parallel to the ground or to tilt or bank to one side or the other. (Finding X, R. 14–15.)

One of the basic problems that for many years baffled experimenters in aviation in connection with the development of heavier-than-air machines, was the question of maintaining lateral equilibrium. Inability to reach a solution of this difficulty was perhaps one of the principal obstacles in making airplanes possible. The matter came to a head in the first decade of this century. Among the leading pioneers in aviation were the Wright Brothers, who directed their efforts toward developing a heavier-than-air flying machine propelled by an engine. The first successful flight was made by the Wright Brothers at Kitty Hawk, North Carolina, in December 1903. That historic event represented the solution of a problem that

had been perplexing scientists and aviation experimenters for a long time.

The court below denominated the means for maintaining the lateral equilibrium of the airplane as "wing distortion" (R–39). The specific device by which this was accomplished by the Wright Brothers was known as wing warping. A portion of the outer end of each wing was subjected to a warping force, so that one end was inclined upward and the opposite end downward, or vice versa. By this process the airplane was caused to tilt to the right, or to the left, as desired. The original process of wing warping has been generaly superseded by the use of ailerons, i. e., hinged segments cut out of the wings, which may be turned up or down (R–40). The invention made by the Wright Brothers is embodied in United States Letters Patent, No. 821,393, issued on May 22, 1906 (Findings XXIV, XXXI, R. 25, 30; Binder, p. 26).

The Wright patent forms the basis of the practical art of flying "heavier-than-air" machines. Thus, in *Wright Company* v. *Herring-Curtiss Co.,* 211 Fed. 654, 655, the Circuit Court of Appeals for the Second Circuit, in upholding the Wright patent, stated that "the patentees may fairly be considered pioneers in the practical art of flying with heavier-than-air machines." See also *Wright Company* v. *Paulhan,* 177 Fed. 261. The court below in this case likewise stated that the Wright Brothers solved the problem of maintaining the equilibrium of the airplane (R–57–58).

C. Airplane Control Apparatus

As stated above, the basic apparatus by which the equilibrium of an airplane is controlled comprises the "elevator"—a horizontal tail surface hinged to the body of an airplane, which is used to control the longitudinal attitude of the craft—and the ailerons—hinged segments cut out of the wings, which are employed to control its lateral equilibrium. Some mechanism was needed, to be manipulated by the pilot for the purpose of effecting the desired motion of the elevator and the ailerons. The obvious and natural mechanism to be utilized for that purpose is a lever or a series of levers of some sort, which through intermediate connections would transmit the desired motions to the control surfaces.

Various types of apparatus of this class were disclosed in the early patents. Thus the French patent to Penaud and Gauchot, issued on February 18, 1876, suggests a vertical lever or rod, carrying a horizontal transverse bar, for the purpose of controlling the elevator and the rudder by its different movements (Findings XXIV, XXV, R. 25–26; Binder, p. 150). The French patent to Macedo, granted on July 3, 1899, suggests a somewhat similar vertical lever for the purpose of controlling the lateral equilibrium and the steering of the airplane (Findings XXIV, XXVII, R. 25, 27; Binder, p. 172). Still another apparatus of the same type is disclosed in the French patent to Laroze, dated

June 30, 1905 (Findings XXIV, XXVIII, R. 25, 28; Binder, p. 180).

Captain Ferber, of the French Army, was one of the early workers in the field of aviation (Finding XL, R–33), and in 1904 he built an airplane having a single horizontally mounted lever or rod, which was pushed or pulled for the purpose of operating the elevator, and which was swung from side to side for the purpose of steering the airplane (Finding XLI, R–34). Even prior to that time, Bleriot, who is remembered in the history of aeronautics as the man who in 1909 made the first flight across the English Channel, had constructed a flying machine which had a control system comprising a horizontal lever mounted on a universal joint and, therefore, capable of motion in all directions. The lever was connected to a tail surface, which constituted both a horizontal and a vertical rudder. (Finding XLII, R–35.)

Esnault-Pelterie, who was a contemporary of Captain Ferber and Bleriot, devised an apparatus consisting of two parallel levers. One of them was intended to operate the rudder for the purpose of steering the airplane, and the other was connected with the elevator and the wings for the purpose of controlling the longitudinal and lateral equilibrium. His first design, as disclosed by his first French patent (French Patent No. 372753, published April 18, 1907; Finding IV, R–7; Binder, pp. 189–192), proposed to place these two levers in a horizontal position. His second and third

French patents (French patent No. 373763, published May 27, 1907, and French patent No. 373818, published May 28, 1907; Findings III, V, R–8; Binder, pp. 199, 205), as well as his United States patent, which is involved in this litigation, suggested that the levers be installed in a vertical position. He does not appear ever to have put his first design into practice, but in 1907 he built an airplane in which his second design was utilized. It does not appear that more than one airplane was ever built embodying that mechanism (Finding VI, R–9).

The Wright Brothers developed and put into use an apparatus consisting of two vertical levers. Curtiss used a vertical lever on which was mounted a wheel, for the purpose of steering the airplane and controlling its longitudinal equilibrium, while a shoulder yoke strapped to the pilot's body was employed to affect its lateral equilibrium. (Finding XXXIX, R–33.)

D. Respondent's French Patents

Esnault-Pelterie obtained three patents in France relating to the general subject matter involved in this litigation. The application for his first patent, No. 372753, was filed on December 19, 1906. The patent was published on April 18, 1907 (Finding III, R–6; Binder, p. 184). In addition to other matters not material to this case, it disclosed two horizontally mounted levers for the purpose of

controlling the tail surfaces of the airplane. As stated above, it does not appear that any airplane was actually constructed in accordance with the disclosure of this patent (Finding IV, R–7–8).

The application for his second French patent—No. 373763—was filed on January 19, 1907, while his third patent, No. 373818, was applied for on January 22, 1907. Both were granted on March 28, 1907, and published on May 27 and May 28, 1907, respectively (Finding III, R. 6; Binder, p. 196). Both patents disclosed a pair of control levers placed in a vertical position, instead of horizontally as was done in the first patent. The left hand lever was intended to control the rudder, while the right hand lever was movable in all directions and was designed to control the longitudinal and lateral altitude of the airplane. The distinction between the latter two patents is found in the type of the tail surfaces proposed to be employed. In each instance the tail surfaces intended to control both the longitudinal equilibrium and the steering of the airplane consisted of a single integral unitary structure, instead of comprising separate and independent surfaces, such as the elevator and the rudder, as is the modern practice (Finding V, R–8). One airplane embodying the apparatus described in the third patent was constructed by Esnault-Pelterie (Finding VI, R. 9), while the apparatus described in the second patent does not appear ever to have been put into practice.

E. The Patent in Suit

The respondent's application, which resulted in the granting of the patent in suit, was filed in the Patent Office on January 16, 1908 (Finding VII, R. 10). As the application for the first French patent had been filed on December 19, 1906, more than a year had expired between that date and the filing of the application in this country. Consequently, the respondent was not entitled to cover in his American application any matter covered by the first French patent.[3] The application in this country, therefore, is directed to the subject matter of the respondent's second and third French patents, which were applied for less than one year prior to the filing of the application in the United States (Finding III, R. 6–7). (See also Opinion, R. 47.)[4]

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[3] R. S., Sec. 4887 (see Appendix, page 103, *infra*) in effect provides that a patent application filed in the United States by a person who has previously filed an application for a patent for the same invention in a foreign country, which affords similar privileges to citizens of the United States, shall have the same force and effect as the same application would have if filed in this country on the date on which the application was filed in such foreign country, provided the application in this country is filed within twelve months thereafter.

[4] By French law, an applicant for a patent on a basic or primary invention is given, for one year thereafter, the right to obtain all patents for "an *alteration*, improvement, or addition to the invention which forms the subject

The description and the drawings forming a part of the application disclosed an airplane with tail surfaces for the purpose of controlling the longitudinal equilibrium and steering. Three embodiments of the alleged invention are shown. In the first, the steering rudder and the elevator are mounted on an integral ring-like structure at the rear of the airplane in such manner that the rudder is rotated about a vertical axis, while the elevator rotates about a transverse horizontal axis. The second embodiment is an airplane with a single tail surface, which pivots about a horizontal longitudinal axis for the purpose of steering the airplane, and also about a transverse horizontal axis for the purpose of regulating its longitudinal equilibrium. In both embodiments there are shown two vertical levers to be manipulated by the pilot. The right hand lever is mounted on a universal joint and is capable of movement in all directions. It is connected by means of wires to the wings and the elevator in such manner that the movement of the lever to the right or left causes the wings to become warped and thereby the lateral attitude of the air-

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of the original patent", to the exclusion of all competitors (Article 18 of the Patent Law of France, dated July 5, 1844, as amended). The United States courts have taken judicial notice of this provision of the French law (cf. *Esnault-Pelterie* v. *Chance Vought*, 66 F. (2d) at p. 475, bottom of 1st column and top of second column; 56 F. (2d) at p. 395, bottom of second column).

plane changed, while a fore-and-aft movement of the lever causes the elevator to be inclined upward or downward as desired and the airplane to ascend or descend. The left hand lever regulates the steering of the craft (Finding XIII, R. 17–19). A third embodiment is the so-called "tandem-wing" structure (see p. 53, *infra*).

On February 1, 1909, the respondent rewrote the specifications. In addition to claiming other features of the airplane, not relevant to this litigation, the application contained claim 2, which purported to cover a lever controlling both lateral and longitudinal equilibrium, without indicating whether such lever was horizontal or vertical. It further contained claim 13, which was limited to a vertical control lever.

The Patent Office examiner rejected claim 13. Twice the applicant requested reconsideration, but the examiner adhered to his original determination. On May 23, 1912, the respondent cancelled the claim, thereby withdrawing from the consideration of the Patent Office the request for a patent on a vertical control lever. Thirteen months later, on June 12, 1913, the applicant filed additional claims, among which were claims covering the vertical control lever. These claims were allowed, and on November 3, 1914, the patent issued (Finding VIII, R. 10–13).

The charge of infringement is limited to claim 2 and claims 5–9, inclusive.

Claim 2 purports to cover the control lever generally without specifying whether its position is horizontal or vertical.

Claims 5, 6, and 9 relate to the single vertical control lever.

Claim 7 relates to the single vertical control lever with the limitation that such lever is operable by the reflex movements of the aviator's body.

Claim 8 purports to cover the single vertical lever with the limitation that it should so operate that its forward movement would direct the airplane downward, its rearward movement would elevate it, while its movements to the right and left would ~~raise~~ tilt the airplane to the right or left, respectively (Finding IX, R–13–14).

The claims in issue read as follows:

> 2. An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder.
>
> 5. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability.
>
> 6. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, means

for steering in a horizontal plane, a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability, and separate means for operating said steering means.

7. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability, said single lever being operable by reflex movements of the body of an aviator to restore said aeroplane to an even keel when it departs therefrom in either a lateral or longitudinal direction.

8. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability, and a single vertical lever movable in every direction operating upon both said means for producing lateral stability and said means for producing longitudinal stability, said lever, upon forward movement thereof, operating said means for producing longitudinal stability to direct the aeroplane downwardly, said lever, upon rearward movement thereof, operating said means for producing longitudinal stability to elevate the aeroplane, said lever, upon movement thereof to the right and left, operating said means for producing lateral stability to raise the aeroplane on the left and right respectively.

9. In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability and a single vertical lever for operating both said means for producing lateral stability and said means for producing longitudinal stability, said lever being mounted upon an universal joint and being oscillatable in every direction.

SPECIFICATION OF ERRORS TO BE URGED

The Court of Claims erred:

1. In holding that the patent in suit covers a single control lever that was patentable over prior disclosures.

2. In failing to hold that the claims of the patent in suit should be construed as being limited to a combination comprising a lever and a single integral or unitary tail structure of an airplane.

3. In holding that the patent in suit covers a device that was patentable over respondent's French patent, No. 372753, applied for on December 19, 1906, and issued on February 28, 1907.

4. In failing to hold that the patent in suit was invalid by virtue of the fact that, although the application therefor was filed on January 16, 1908, the claims alleged to cover the single control lever here involved were not inserted into the application until June 12, 1913; the control lever, during the intervening period, having come into general use in the United States and having been described in printed publications.

5. In failing to hold that respondent was estopped, by acquiescing in the rejection by the examiner of patents of claim 13, from contending that the claims of the patent in suit should be construed to cover a single lever for operating the means of controlling the equilibrium of an airplane.

6. In failing to hold that the patent in suit, if construed to embrace a single control lever, is invalid by virtue of the fact that its claims are not supported by its disclosure.

7. In failing to hold that the patent in suit, if construed to embrace a single control lever, is invalid by virtue of the fact that the control lever alleged to be covered by the patent was in public use in France prior to the date of its alleged invention by the respondent.

8. In holding that the claims of the patent in suit were infringed by the United States.

SUMMARY OF ARGUMENT

I

The airplane control lever or "joy-stick", which the patent in suit is claimed to cover, is not a patentable invention. A vertical lever mounted on a universal joint and operating two distinct mechanisms by its various movements, is a well known mechanical device and has been used in various arts. It was not invention to adapt it to an airplane, since it does not constitute invention to

apply a well known device to a new use. This is especially true in view of the fact that the prior patents on which the petitioner relies are in analogous arts. The airplane control lever was within the range of mechanical skill and did not rise to the dignity of an invention. There is no merit in the contention that the element of invention is found in the alleged instinctive character of the operation of the control lever.

II

In view of the prior art, the patent, even if valid, should be construed as limited to a combination comprising a pair of vertical control levers with a single integral or unitary tail surface. If so construed, the patent admittedly has not been infringed.

III

The respondent's first French patent was applied for more than twelve months prior to the filing of his application in the United States. Consequently, he is barred from receiving a patent in this country on the structure disclosed in his first French patent. However, there is no patentable difference between his first French patent and the patent in suit. The former disclosed horizontal levers, while the latter discloses vertical levers performing the same functions. It is not invention to change a lever from a horizontal to a vertical position.

IV

The claims of the patent are not supported by the disclosure. The specification shows a combination of two cooperating and coacting vertical levers connected with an integral tail surface. The claims purport to cover a single vertical lever operating independently.

V, VI, VII

The claims in suit on the vertical control lever were inserted in the application by amendment five and one-half years after the original filing. During the intervening period the control lever came into general use in this country. The courts guard the public against the enlargement of the scope of a patent application during its pendency in the Patent Office. A claim that had been previously a part of the application, and which purported to cover the vertical control lever, had been rejected by the Patent Office and had been canceled by the applicant. The present claims were inserted thirteen months later. By acquiescing in the rejection of the original claim the respondent is estopped from asserting that the claims in suit should be construed to cover the vertical control lever.

The respondent is not the first and original inventor of the control lever, as both Captain Ferber and Bleriot used it before he did. The respondent was aware of Bleriot's invention at least as early as the date on which the present claims were inserted into the application by amendment.

VIII

The petitioner's airplanes do not utilize the respondent's structure. The latter is a two-stick control system, while the petitioner uses a single control lever. The claims purport to cover the lever in combination with means for maintaining longitudinal and lateral stability. In petitioner's airplanes stability is maintained by certain built-in mechanisms, while the surfaces with which the lever is connected are used for the purpose of controlling the attitude or equilibrium of the airplane.

ARGUMENT

I

THE PATENT IN SUIT IS INVALID AS CLAIMING A DEVICE NOT PATENTABLE OVER PRIOR DISCLOSURES

The device which the respondent asserts is his invention and which he contends is covered by the patent in suit is a vertical lever mounted on a universal joint and capable of movement in all directions, which is installed in an airplane and is so connected with the elevator and ailerons as to make it possible for the pilot to control the former by a fore-and-aft motion, and the latter by a sidewise motion of the lever. The virtue of this contrivance is said to consist in the fact that by means of different movements of one lever it is possible to actuate two entirely different and distinct mechanisms. This device, however, is old and well

known and does not involve any element of novelty or patentability.

A. PRIOR PATENTS

As early as March 11, 1879, U. S. Patent No. 213079 was issued to Wadsworth (Finding XXIV, R. 25; Binder, p. 234).

The disclosure of the Wadsworth patent is summarized by the court below in Finding XXXII (R. 30), as follows:

> United States patent to Wadsworth, #213079, issued March 11, 1879, discloses a single vertical lever mounted on a universal joint and actuating one mechanism or engine by a motion in one plane and actuating a second mechanism or engine by a motion in another plane at right angles to the first plane. By an oblique or diagonal motion of the lever both mechanisms are capable of simultaneous actuation.

The foregoing summary of the Wadsworth device may be adopted without change of phraseology as a description of the modern airplane control lever, the construction of which is shown in detail in Finding XXI (R. 22–23).

The airplane control lever is "a single vertical lever mounted on a universal joint and actuating one mechanism [i. e., elevator], by a motion in one plane and actuating a second mechanism [i. e., ailerons] by a motion in another plane at right

angles to the first plane. By an oblique or diagonal motion of the lever both mechanisms are capable of simultaneous actuation."

The Court of Claims (R. 65) rejected the Wadsworth patent and did not consider it germane, on the ground that it disclosed an application of the device to the steering engine and the propelling engine of steam vessels, traction engines, and the like; that it related to a non-analogous art; and that it did not suggest the concept of the equilibrium control of an airplane. It is submitted that this was error, for two reasons.

First, Wadsworth makes it quite clear that he is not proposing a device for use in a particular art, or in conjunction with specific mechanisms. He expressly states that what he is patenting is a single lever mounted on a universal joint for the purpose of controlling the action of any two different mechanisms. He announces that it is his object "to control through one lever or handle the simultaneous or independent action of engines or mechanisms, so that they may be worked singly, together, or in opposition." (Wadsworth patent, defendant's exhibit D–112, lines 10–14, Binder, p. 235).

Thus, the invention is a generic one and is not limited or restricted to a specific art. It is a mechanical device found in a large repository of contrivances open to any person skilled in any art. "Certain devices are common to the arts as a whole,

because they are adapted for use in many situations." *In re Morgan,* 38 App. D. C. 274, 275.[5] The airplane "joy-stick" is nothing but the Wadsworth lever built into an airplane and attached by intermediate connections to the ailerons and the elevator.

It is well established that it does not constitute invention to take a well-known device and apply it to a new use or purpose. *Blake* v. *San Francisco,* 113 U. S. 679, 682; *Pennsylvania Railroad Co.* v. *Locomotive Co.,* 110 U. S. 490; *Wollensak* v. *Sargent,* 151 U. S. 221, 227; *Lovell Mfg. Co.* v. *Cary,* 147 U. S. 623; *Mast Foose Co.* v. *Stover Mfg. Co.,* 177 U. S. 485, 492–4.

Second, it is submitted that it was erroneous for the Court of Claims to hold that the specific application of his invention shown by Wadsworth was in an art not analogous to aviation. Wadsworth discussed the possible use of his device in connection with the steering apparatus and the engine of a steam vessel. It can hardly be said that marine navigation, aerial navigation, and land navigation are non-analogous arts. Types of apparatus used in

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[5] *L. Schreiber & Sons Co.* v. *Grimm* (C. C. A. 6th) 72 Fed. 671, 674–675 (ball and socket joint); *Warner Instrument Co.* v. *Stewart & Clark Mfg. Co.* (C. C. A. 7th) 185 Fed. 507 (swivel joint connection); *Muser* v. *Bell* (C. C. A. 2d) 278 Fed. 904, 912 (reversing mechanism); *In re Colman,* (App. D. C.) 30 F. (2d) 1000 (specific types of governor); *In re Weingartner* (Ct. of Customs & Patent App.) 58 F. (2d) 442 (transmission gears).

one class of vehicle or craft are frequently adopted for a different class of transportation facilities.[6]

United States patent to Weeber, #704156, issued on July 8, 1902 (Findings XXIV, XXXIII, R. 25, 30; Binder, p. 237), disclosed a single universally mounted lever for controlling by its various movements the steering apparatus and the brakes of an automobile. British patent to Wilson, #20022 of 1889, showed a similar lever for closing and opening electric circuits (Findings XXIV, XXXVI, R. 25, 31; Binder, p. 240). United States patent to Simpson, #909468, granted on January 12, 1909, disclosed a vertical shaft capable of being tilted in any direction for the purpose of controlling a hydroplane boat (Finding XXXVII, R. 31; Binder, p. 258).

None of the patents here discussed was cited by the Examiner during the pendency of the application in the Patent Office. This circumstance enhances their importance as anticipatory references.

It is clear from the foregoing summary of the prior art that the use of a single lever universally mounted for the purpose of controlling distinct mechanisms by its various movements was old and well known in the mechanical arts. Clearly the person who first designed the airplane joy-stick made but a judicious selection from the devices already available to him.

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[6] See pp. 34–35, *infra*.

Moreover, there was no novelty in the use of vertical levers for manipulating airplane controls. The French patent to Laroze issued in 1905 showed an airplane provided with a vertical lever which was rotated for the purpose of controlling the lateral equilibrium of the machine and which was pushed forward or pulled rearward for the purpose of controlling its longitudinal equilibrium (Findings XXIV, XXVIII, R. 25, 28; Binder, p. 175). This patent is a direct anticipation, for it discloses a single vertical lever, which by its various movements controls the lateral and longitudinal equilibrium of an airplane.

As taught by the Wright patent (Plaintiff's Exhibit 50, Binder, p. 26; see also Finding X, R. 14–15), there are *three,* and *only* three, fundamental movements or maneuvers which are executed by an airplane while flying. Three corresponding controls are required. With these three controls, all the required maneuvers of an airplane can be performed (R. 39–40):

(1) The first movement is the up-and-down one ("pitch"). That, the Wrights controlled by their "*elevator*" 31 in front of the plane.[7] The pilot lay face downward in the cradle 18, with his head toward the front of the machine. With his hands he grasped the roller 37. By twisting it he could

[7] See Figure 1, Wright Patent, Binder, p. 33.

tilt the elevator 31 to make the plane go up or down. The elevator is used in modern airplanes.

(2) The second movement is steering in a horizontal plane, as in a boat (this directional change is sometimes called "yaw"). This the Wrights accomplished by the vertical "*rudder*" 22 at the back of the plane. The vertical rudder is used in modern airplanes.

(3) The third movement is the "roll" or "banking" of the airplane about a longitudinal horizontal axis. It serves either to keep it upon an even keel laterally, or to tilt one wing higher than the other when it is desired to "bank" the airplane, as when making a turn. This movement was effected by the Wrights by distorting or "*warping*" the tips of the wings *a d, b c, e h, f g,* as indicated by the dotted lines in figure 1 of the patent. Such wing warping has now been superseded by the "ailerons" or small hinged flaps at the rear of the wings, which are generally used today, but the principle and operation of the two are identical (R. 40).

Both the second and third "organs"—rudder and wing tips—were controlled simultaneously, in the Wright machine (and the corresponding motion of the airplane produced), by sidewise movement of the cradle 18, upon which the pilot lay face down. He shifted to his *right* when he wanted the machine to turn to the *right,* and to his *left* when he wanted to turn to the *left.* A shift to the right turned the steering rudder 22 to the right by means of the

cable 27, and simultaneously warped the tips of the wings 1 and 2 to bank to the right. By shifting to the left, the pilot both steered and banked to the left.

The first "organ"—the elevator for ascending and descending—was controlled by the separate roller 37.

The Wright patent thus enunciates the fundamental principles of flight which are utilized in every airplane today. It shows the three fundamental movements of an airplane—vertical ("pitch"), horizontal ("steering" or "yaw"), and banking ("roll")—and provides a control for each.

As stated above, the Wrights later employed a separate vertical lever for operating the elevator and another vertical lever to control the wing warping and the steering rudder.[8]

As its title states, the Laroze patent (Defendant's Exhibit 6, Binder, p. 176) relates to "principles employed in the construction of an aeroplane *to insure its stability.*" (Italics added.) The patent opens with the statement that the whole problem of aviation may be reduced to the problem of *securing stability.* To that end the patentee provides "a simple device" for controlling the evolutions of the plane—namely, a single vertical lever with a steering wheel at the top—"which can *alone* [i. e., by itself] give to the apparatus a sufficient

[8] See page ~~27~~ 10, *supra.*

latitude to enable it to make evolutions with ease." (Italics added.)

The specification shows that Laroze, like the Wrights, fully understood the three fundamental movements of an airplane, and his diagrams show the three axes about which these movements take place. Not only does he provide the "organs" or control surfaces (ailerons; vertical and horizontal rudders) for producing or controlling these three movements of the plane to secure stability; but he also puts his "organs" under the control of the "simple device" which he describes as *a single vertical lever* with a steering wheel at the top.

Figure 4 (Binder, p. 175) shows the details of the Laroze control (R. 28). The upstanding vertical column HP is pivoted at P and surmounted by a steering wheel WHW′. The pilot sits behind the wheel facing outward from the page. The entire column is rocked fore-and-aft about pivot P, to control the up-and-down motion or "pitch" of the plane. The wheel is twisted to rotate the column about the vertical axis, HP, to control the ailerons shown at *a, b, c, d, e, f, a′, b′, c′, d′, e′, f′*.[9] This twisting, for example, by the pilot grasping the wheel at W and W′ and treating it like the han-

[9] The ailerons at each end of the fixed wing may be in one piece as indicated in figure 4, or in three pieces as shown in figure 1, where the two fixed wings are shown at A, B, C, D, and A′, B′, C′, D′, and the ailerons at *a, b, c, d, e, f*, and *a′, b′ c′, d′, e′, f′*.

dle bars of a bicycle, *rolls* or *banks* the plane to the right or left as the pilot may desire, by movement of the ailerons. Laroze still further simplifies his control by combining in the same instrumentality his steering function, to operate the vertical rudder E. This he accomplishes by making the wheel WHW′ capable of being turned like the steering wheel of an automobile, to steer the airplane in a horizontal direction.

Forward motion of the column HP causes the plane to nose up, and backward motion causes the plane to pitch down (Finding XXVIII, R. 28). That is the same response as in figure 7–a of the patent in suit, in which *forward* motion of the lever 86 causes the plane to nose *up,* and *backward* motion causes the plane to go *down.*

As the district court found in the Chance-Vought case (56 F. (2d) at p. 398, 1st column) in figures 1, 2, and 3, Laroze has a response opposite to that in figure 4. As in Fig. 6 of the patent in suit, *forward* motion of the column HP of the Laroze patent causes the plane to pitch *down,* and *backward* motion causes the plane to point *up.*

To pass from Laroze's figure 4 arrangement to his arrangement of figures 1, 2, and 3 (Binder, p. 175), a mere reversal of the linkage is necessary and seems plainly within the skill of the ordinary mechanic. Thus, the district court said (p. 398, 1st column, of 56 F. (2d)):

> The longitudinal response of the plane in Fig. 4 of the Laroze patent, and in Fig. 7a

> of the patent in suit, is *opposite* to the rocking movement of the lever or column HP. If it be desired, however, to rise or dip *with* the rocking movement of the lever or column HP, all that is needed is to reverse the linkage. *No such reversal of linkage is necessary in the modifications of Figs. 1, 2, and 3* [of Laroze]. (Italics supplied.)

Laroze and the patent in suit are alike in that both show *both* responses to fore and aft movement of the joy-stick. In neither is any emphasis put upon one response in preference to the other. As Judge Campbell said, following the quotation just given:

> In Laroze and in the patent in suit *both* responses are shown, and *in neither is any emphasis whatever put on any particular hook-up.* (Italics supplied.)

French patent No. 111574, issued to Penaud and Gauchot in 1876 (Findings XXIV, XXV, R. 25–26; Binder, p. 136), describes with prophetic accuracy many of the features incorporated in modern airplanes. For example, it shows substantially all of the fixed surfaces which are built into a modern plane to give it inherent stability, which, as will be shown hereafter, the respondent entirely avoided.

The control of the horizontal and vertical rudders is by a *single vertical lever,* surmounted by a horizontal cross bar. Pulling the lever back or pushing it forward causes the horizontal rudders to go up or down, just as in the patent in suit. As in

the patent in suit, no particular directional response is indicated in preference to the other. For steering in a horizontal plane, the cross-bar is turned like the handle bars of a bicycle (Finding XXV, R. 26).

French patent to Macedo, No. 290488, issued in 1899 (Finding XXIV, R. 25; Binder, p. 168), disclosed a flying machine in which a vertical lever controlled the lateral equilibrium of the craft by a fore-and-aft motion. By a rotating motion, the same lever steered the machine (Finding XXVII, R. 28).

As shown by the Wright patent, there are only three *possible* motions, and three corresponding controls, for an airplane. These were also clearly described by Laroze. The Wrights put two of them, wing-warping (roll) and vertical rudder (steering), under a single instrumentality, and controlled the horizontal rudder (pitch) separately. Later, the Wrights had a separate control for the vertical rudder. Laroze controlled all three movements by his single vertical lever with a steering wheel at the top. Penaud & Gauchot controlled their vertical and horizontal rudders by their single vertical lever, with a cross-bar at the top. In his first French patent (from which the patent in suit must, admittedly, be patentably different to be valid) the plaintiff put pitch and roll under control of a single *horizontal* lever, and steering under the control of a separate *horizontal* lever. In that state of the art, what room was there for

invention in the patent in suit, in controlling the very same movements by two *vertical* handles?

In view of the foregoing state of the art, it is submitted that Judge Manton was correct when in passing on the patent in suit in *Esnault-Pelterie* v. *Chance Vought Corporation,* 66 F. (2d) 474, 478, he said:

> There is no novelty in the use of a lever to operate two or three controls, or in determining, as an engineering problem, the choice as to which of the three controls should be operated by a single lever.
>
> * * * * *
>
> The great advance in flying aeroplanes has been due largely to improved engines, the weight of which, per horse power, has been greatly reduced so as to make possible increased speed and power with the same weight. This largely accounts for the superiority of modern aeroplanes over the prior art.

A similar view was expressed by Judge Campbell in the District Court in the last mentioned case, in the following language, 56 F. (2d) 393, 401:

> There certainly was no novelty in the use of a well-known control device, the lever, to effect the control of two of the three controls, nor in the selection of the two of the three controls to be so effected, as it was a mere matter of engineering choice as to which of the three organs should be operated by a single lever.

B. THE PRIOR PATENTS ARE IN ANALOGOUS ARTS

The Court of Claims discarded the Wadsworth, the Wilson, the Weeber, and the Simpson patents, discussed above, on the ground that they did not relate to arts analogous to that to which the patent in suit was directed. (See opinion R. 64–65.) It is submitted that this conclusion is erroneous. By implication, the opinion of the court below does not controvert the validity of the proposition that it does not constitute invention to adopt an old device to a new and unforeseen use. The court, however, indicates that this principle should be limited to instances in which the new use is in an analogous art, and it further holds that in this instance the arts are not analogous.

To say that control levers for boats and ships, for automobiles, and for airplanes are not in analogous arts seems untenable. For example, internal combustion engines are used on boats, automobiles, and airplanes. The internal combustion engine when first invented may have been patentable subject matter. On the other hand, to instal an internal combustion engine in a new type of vehicle would hardly constitute invention. Again, marine propellers had been well known and had been used as a mechanism for propelling steam vessels for a great many years. When airplanes were designed, propellers, in a modified form, were used in connection with airplanes for a similar purpose. Clearly, the use of propellers on

airplanes as means of propulsion was not patentable, in view of the fact that propellers were an old and well-known device.

The authorities clearly and inescapably lead to the conclusion that the patents upon which the respondent relies as anticipations of the patent in suit are in analogous arts.

Bush v. *Fox*, 5 H. L. C. 707; *Harwood* v. *Great Northern Railway Company*, 11 H. L. C. 654, 676; *Brown* v. *Piper*, 91 U. S. 37, 41; *Royer* v. *Roth*, 132 U. S. 201; *St. Germain* v. *Brunswick*, 135 U. S. 227; *Consolidated Roller Mill Company* v. *Walker*, 138 U. S. 124; *Ansonia Brass and Copper Company* v. *Electrical Supply Company*, 144 U. S. 11; *Powers-Kennedy Contracting Corporation* v. *Concrete Co.*, 282 U. S. 175.[10]

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[10] Patent Office tribunals have held that it is not invention to adapt the steering mechanism of a boat to an automobile (*Ex parte Ross*, 317 Patent Office Gazette 237), or a gyroscopic apparatus designed to indicate the rate of roll of a ship to an airplane (*Ex parte Sperry*, 2 U. S. Patents Quarterly 4). See also *Standard Caster & Wheel Co.* v. *Caster Socket Co.*, 113 Fed. 162, 164–165 (C. C. A. 6th); *Ransome Concrete Mach. Co.* v. *United Concrete Mach. Co.*, 177 Fed. 413, 415–416 (C. C. A. 2d) (tea mixing and concrete mixing machines held analogous); *Model Bottling Machinery Co.* v. *Anheuser-Busch Brewing Ass'n.* (C. C. A. 8th) 190 Fed. 573, 575 (art of curing fish and pasteurizing beer held analogous). *In re Schneider* (Ct. of Customs & Patent App.) 47 F. (2d) 970 (window sash weights and boxes for transportation of briquettes held analogous). *In re Endacott* (Ct. of Customs & Patent App.) 58 F. (2d) 444.

C. THE DEVICE DOES NOT RISE TO THE DIGNITY OF AN INVENTION

It is submitted that in the light of the prior art, the utilization of a vertical lever, mounted on a universal joint for the purpose of actuating the elevators and the ailerons of an airplane, was within the range of mechanical skill and did not rise to the dignity of an invention. To design it was within the skill of the art and did not require inventive genius.

The suggestions advanced from time to time by counsel and adopted by the Court of Claims, that the device made possible rapid advance of aviation and constituted a radical improvement in the construction of aircraft, even if correct, are immaterial.

The position of the Government on this point is fully substantiated by numerous decisions of this Court, in which patents on new devices of much greater and more far reaching importance and significance than the airplane joy-stick, were held invalid as covering not invention, but only the products of mechanical skill.

DeForest Radio Co. v. *General Electric Co.*, 283 U. S. 664 (Langmuir patent on the high-vacuum tube); *Paramount Publix Corp.* v. *American Tri-Ergon Corp.*, 294 U. S. 464 (process for producing sound films); *Altoona Publix Theatres, Inc.* v. *Tri-Ergon Corp.*, 294 U. S. 477 (machines for re-

cording and reproducing talking motion pictures); *Carbide Corporation of America* v. *American Patents Development Co.*, 283 U. S. 420 ("dry-ice"); *Aron* v. *Manhattan Railway Company*, 132 U. S. 84 (gates for elevated railroads); *Minerals Separation Corporation* v. *Magma Company*, 280 U. S. 400; *Powers-Kennedy Corporation* v. *Concrete Company*, 282 U. S. 175, 186; *Saranac Automatic Machine Corporation* v. *Wirebounds Patents Company*, 282 U. S. 704; *Smith* v. *Magic City Kennel Club*, 282 U. S. 784; *Permutit Co.* v. *Graver Corporation*, 284 U. S. 52; *Electric Cable Co.* v. *Edison Co.*, 292 U. S. 69.

The argument that the acceptance of the patented device by the industry is evidence of invention is negatived by the cases discussed above, as well as by many other decisions of this court. *Grant* v. *Walter*, 148 U. S. 547, 556; *McClain* v. *Ortmayer*, 141 U. S. 419, 428.

Applying the foregoing principles to the patent in suit, the conclusion seems inescapable that the adoption of a vertical lever mounted on a universal joint for the purpose of controlling by its movements in various directions, the elevator and the ailerons of an airplane, no matter how useful and desirable, was nothing more than the adaptation, in a manner not rising to the dignity of an invention, of well known principles and devices familiar to all skilled in the mechanical arts.

D. THERE IS NO MERIT IN THE CONTENTION THAT THE ELEMENT OF INVENTION IS FOUND IN THE ALLEGED INSTINCTIVE CHARACTER OF THE OPERATION OF THE CONTROL LEVER

The control lever of an airplane is usually so connected with the elevator and the ailerons that a forward movement of the lever causes the airplane to nose downward; a rearward movement of the lever causes the airplane to nose upward; a movement of the lever to the right causes the airplane to bank or tilt downward to the right; while a movement of the lever to the left causes the airship to bank or tilt downward to the left.

It has been contended by the respondent, and was held by the Court below, that the fact that the airplane follows the direction of the tilt of the stick makes the operation of the device quasi-instinctive and practically reflex, and, therefore, exceedingly simple. It is asserted that the natural instinct of the pilot would cause him unconsciously to move the lever in the direction in which he desires the airplane to respond. It is then argued that this is a feature justifying the conclusion that the device was a product of inventive genius rather than mechanical skill. We submit that this position is untenable for a number of reasons.

If instinctiveness is in fact a feature of the airplane control system, it is no part of the invention disclosed or covered by the patent in suit. It is not inherent in the lever itself. The lever can be

connected at will in such manner as to make the directional responses of the airplane opposite to those of the movements of the stick, or it can be connected in such manner as to make the directional responses of the craft in accordance therewith. In other words, the alleged instinctiveness results not from the control lever, but from the arrangement of the linkages between the lever and the elevator and the ailerons. If the connections on the modern type of airplane were reversed, the manner of operation of the control lever would be "contra-instinctive", and yet the same device would still be utilized.

The specific arrangement of these intermediate connections was not covered by the claims of the patent in suit, probably because it was recognized that it would hardly constitute patentable subject matter. Consequently, the alleged instinctive character of the operation of the control system may not be used to support the contention that the airplane joy-stick involves the element of invention.

There is another basic fallacy in the respondent's contention in this regard. If the element of discovery or invention is found in the manner of operation of the device and not solely in the mechanism itself, such concept, no matter how useful or valuable it may be, may not be made the subject matter of a patent, unless, perhaps, the patent covers a process. The patent law provides for

the granting of monopolies on inventions or discoveries of any new or useful art (i. e., process), machine, manufacture, or composition of matter (R. S. 4886; U. S. Code, Title 35, Sec. 31). If the invention consists of a machine or mechanism, only the structure itself is patentable. Its function or its mode of operation may not be so covered. This is a well established principle from which this Court has never deviated.

Thus, in *Knapp* v. *Morss,* 150 U. S. 221, 227, it was stated that "it is well settled by the authorities that the end or purpose sought to be accomplished by the device is not the subject of a patent. The invention covered thereby must consist of new and useful means of obtaining that end. In other words, the subject of a patent is the device or mechanical means by which the desired result is to be secured." See also *Holland Furniture Co.* v. *Perkins Glue Co.,* 277 U. S. 245.

In *LeRoy* v. *Tatham,* 14 How. 156, 175, it was said that "A patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever."

Similarly, in *DeForest Radio Co.* v. *General Electric Co.,* 283 U. S. 664, 684, Mr. Justice Stone stated: "It is method and device which may be patented and not the scientific explanation of their operation."

The point we are discussing is well illustrated by the decision of this Court in *Carver* v. *Hyde,* 16 Pet. 513, 519, which involved a patent on an improvement on the cotton gin. The improvement consisted of giving a new form to the ribs composing the grate through which the fibres of the cotton passed. Instead of making each rib of equal thickness throughout, as had been the prior practice, the patentee proposed that at the point at which the fibres were carried through, the thickness of each rib should be greater than at other points, and should be equal to the length of the fibres. The purpose of the improvement was to prevent the grate from becoming choked or clogged. It appeared, however, that the beneficent effect claimed by the patentee was obtained as a result not merely of the form or shape of the rib, but also of the manner in which it was connected with the framework. The court held in an opinion written by Chief Justice Taney that "the end to be accomplished is not the subject of a patent." He further stated that since the defendant did not use the patentee's connections between the ribs and the frame, there was no infringement. In the case at bar, however, the patent does not even contain any claims on the connections.

As a matter of fact, the virtue of the alleged instinctive character of the operation of the control system has been grossly exaggerated and can

hardly be successfully urged in support of the contention that the design of the joy-stick involves invention. Indeed, the Court of Claims itself points out that when an airplane assumes certain abnormal attitudes, such as a spinning nose dive, the pilot cannot depend solely upon the obvious manipulation of the lever in accordance with his instinctive or reflex action. It further states that in blind flying, i. e., flying in fog or through clouds, the pilot has no reference mark such as the horizon, and cannot trust to his balancing instinct to control the airplane, but must direct it by means of instruments designed to guide him under such conditions (Finding XII, R. 16).

Moreover, even in level flight, the element of instinctiveness of necessity plays but a small part in the operation of an airplane. The court below, in its opinion (R. 50) states:

> The defendant in its brief urges that the operation of the joy stick is a matter of acquired habit. We agree with this latter statement with the qualification, however, that any given habit is easier to acquire if it is instinctive rather than contra-instinctive.

In other words, the argument based upon the theory of instinctiveness, in its ultimate analysis, amounts merely to the contention that the manner of operation of the control lever can be acquired by the pilot with greater facility if it is instinctive, rather than contra-instinctive. Surely this is

not sufficient to constitute an invention as distinguished from the result of mechanical skill.[11]

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[11] In *King* v. *Gallun*, 109 U. S. 99, 101, this Court stated that "In deciding whether the patent covers an article the making of which requires invention, we are not required to shut our eyes to matters of common knowledge or things in common use."

In accordance with this principle, it seems proper to call the attention of the Court to well-known controls that sometimes operate in a manner denominated in this litigation as instinctive, and at times contra-instinctive, and yet are managed with equal facility in both instances. Thus, the tiller on a sailboat is moved to the right to make the boat veer to the left, and vice versa. The steering wheel on ships and boats is occasionally so connected that the wheel has to be turned in the direction in which the ship is to be steered, and at times the connections are exactly opposite; and yet the art of steering vessels can be acquired with equal facility irrespective of whether the wheel is connected in one manner or the other. In driving an automobile, the driver sometimes holds the steering wheel at the bottom and sometimes at the top. If he holds it at the bottom, he moves his hands to the left to steer the car to the right, and vice versa; while if he holds the wheel at the top, he moves his hands in the direction in which it is desired to turn the automobile. This interchangeable feature has never been the source of any difficulty to drivers of automobiles. The standard gear-shift on an automobile is pushed forward when it is desired to have the vehicle move rearward. Early automobiles were equipped with horizontal steering levers, which operated in the reverse direction from that in which it was desired to steer the car. A rowboat is commonly steered in a manner which would be denominated contra-instinctive, i. e., the oarsman pulls on the right oar in order to steer to his left and vice versa—and yet no difficulty arises from that circumstance.

The foregoing illustrations seem to demonstrate that facility in operating controls of vehicles, ships, etc., is a matter of habit that is acquired as easily when the response to the controls is contra-instinctive, as when it is instinctive.

As a matter of fact, the suggestion of instinctiveness in the operation of the control lever is a pure afterthought adduced at a late date in an endeavor to sustain the patent. It clearly was not within the contemplation of the patentee when the application for letters patent was filed. The specification will be read in vain in an effort to find any reference, direct or indirect, to the alleged instinctive mode of operation of the joy-stick. It is silent on that point. An examination of the drawings (Binder, p. 7) demonstrates that this thought could not have been in the mind of the patentee, for they show two modes of operation of the joy-stick: one, in which the responses of the airplane are "instinctive", i. e., in which the airplane tilts in the direction of the stick; and the other, disclosed in Figure 7a (Binder, p. 9) in which the responses are "contrainstinctive", i. e., in which the airplane tilts in the direction opposite to that of the movement of the stick (Finding XIII, Paragraph 8–9, R. 18). Apparently the patentee considered the two modes of operation interchangeable and both included within his invention.[12]

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[12] The court below (R. 52) refers in its opinion to the fact that testimony had been adduced to the effect that the construction shown in Figure 7 (a) was the result of a draftsman's error. There is no finding to that effect, however. Moreover, the patent speaks for itself, and the specification can hardly be varied by extrinsic testimony. If Figure 7 (a) was, indeed, an inadvertent error, the statute provides for its correction by an application for a reissue patent. The respondent has not availed himself of this remedy.

It is true that Claim 8 refers to movements of the airplane that are in the same direction as those of the lever. That claim, however, was introduced into the application by amendment on June 12, 1913—five and one-half years after the application had been filed and long after the vertical joy-stick had been adopted by the industry on a large scale. There is no support for that feature of the claim in the specification, and consequently, the claim is invalid. *Permutit Company* v. *Graver Corporation,* 284 U. S. 52.

The observations made by Judge Manton in passing upon this point in *Esnault-Pelterie* v. *Chance Vought Corporation,* are very pertinent, 66 F. (2d) 474, 477:

> The appellant makes claim that there is an instinctive use by the operator of the control levers of the patent in suit in pushing forward to go down and pulling backward to go up. But the patent makes no claim that this operation is preferred to the opposite one of pushing forward to go up and backward to go down. It is not described as part of the invention. In Fig. 7a of the patent in suit, the joy-stick is shown connected by a rod to a vertical arm so that forward motion of the joy-stick causes the plane to point up and a backward pull pushes the plane down. It is agreed that this disclosure is unequivocal. The patent lays no emphasis upon either direc-

> tional response in preference to the other. Indeed, this virtue on which appellant wishes to establish patentability is opposed by two out of the three embodiments illustrated and described, and, conceding that it is inherent in the third, it is not described as part of the invention, nor was it used in the only embodiment made by the patentee. No invention may be claimed for this. *Permutit Co.* v. *Graver Corp.*, 284 U. S. 52, 52 S. Ct. 53, 76 L. Ed. 163.

Judge Campbell in the District Court in that case commented as follows upon this point, 56 F. (2d) 393, 402:

> It does seem to me in the light of all the circumstances, that the claim of a "single lever being operable by reflex movements of the body of the aviator to restore said aeroplane to an even keel when it departs therefrom in either a lateral or longitudinal direction" is clearly an afterthought and not shown in the original specification covered by the original claims. It certainly is not sufficient, in my opinion, to give novelty to the substitution of the lever of the patent in suit over the levers of the prior art.

II

The Patent, if Valid, Should Be Construed as Limited to a Combination Comprising a Pair of Vertical Control Levers With a Single Integral or Unitary Tail Surface of an Airplane

The unique feature which distinguishes the construction disclosed in the Esnault-Pelterie patent consists in the unusual structure of the tail surfaces. As heretofore indicated, modern airplanes are equipped with a hinged horizontal tail surface at the rear, which by being turned up or down causes the airplane to ascend or descend. This tail surface is known as the "elevator." In addition, the airplane is provided with a wholly distinct vertical rudder also hinged to the rear, for the purpose of steering (Finding XXI, R. 22–23). Esnault-Pelterie, on the other hand, proposed to construct an airplane in which the elevator and rudder would be combined into a single integral unitary structure. Two embodiments or applications of this concept are suggested. The first (Binder, p. 2) consists of mounting the elevator and the rudder inside of a large ring attached to the rear of the airplane. This structure, generally referred to in this litigation as the "ring-tail", is rotated about a vertical axis for the purpose of operating the rudder, and about a transverse horizontal axis for the purpose of operating the elevator.

The second embodiment (Binder, p. 3) shows a single tail surface, which may be rotated about the horizontal longitudinal axis of the airplane for the purpose of steering, and about the transverse horizontal axis for the purpose of acting as an elevator. This structure is generally referred to as the "bird-tail". (Finding XIII, R. 17)[13]

Both embodiments involve the use of two vertical levers manipulated by the pilot, the right hand lever being connected with the tail surfaces in such manner as to operate the elevator, while the left hand lever is so connected therewith as to operate the rudder. The right hand lever is likewise connected with the wings in order to control the transverse equilibrium of the airplane. The foregoing is demonstrable by an analysis of the respondent's patents.

In the drawing of his first French patent (defendant's exhibit 7, Binder, p. 195), a plan view of the airplane is shown in Figure 2 and a side elevation in Figure 1. Figure 4 shows the arrangement of the two *horizontal* control levers 22 and 23, which, we submit, it required no invention to turn into the *vertical* position of the patent in suit. The

[13] It does not appear that any airplanes were ever built embodying the "ring-tail" structure. One machine was constructed by Esnault-Pelterie, in which the "bird-tail" conception was utilized. However, the idea of the integral or unitary tail structure was quickly abandoned and separate elevators and rudders came into general use.

mechanical operation of the plane is described in Finding IV (R. 7).

Referring to figure 4, the right-hand lever is shown at 22. It is operated by the pilot with his right hand. Moving the end of the stick *up* causes the plane to go *up,* and moving it *down* causes the plane to go *down.* Moving the stick 22 to the *left* distorts the wings and causes the plane to roll or tip to the *left,* while moving it to the *right* causes the plane to roll to the *right* (R. 7). Thus, this early French patent provided directional response of plane-movement in accord with the movement of a single stick operated by one hand of the pilot.

Sidewise movement of the similar stick 23 (figure 4), operated by the pilot with his left hand, *steers* the plane to the left or right in a horizontal direction, by operation of the steering rudder 4 shown near the upper right of figure 1, but the patent does not indicate in which direction the lever is moved, in order to produce a desired directional response of the plane (R. 7, bottom).

Thus the two horizontal levers 22 and 23, in the plaintiff's first French patent, control the three fundamental movements of the plane—pitch, steering, and roll. Pitch and roll are controlled by the lever 22 and steering by the lever 23.

The lever 23 was intended, also, by up-and-down motion, to have the additional function of tilting the front and back wings simultaneously, so that the plane could rise or descend on an even keel

(R. 8, second paragraph). That function is not in controversy. Esnault-Pelterie abandoned it when he filed his later French patents and the application for the patent in suit.

The United States patent in suit states that:

> The present invention has for its object a *monoplan* aeroplane with one or several pairs of wings which may be directed or distorted as desired, and provided with rudders or with a tail, the combination of such means having the effect of providing for the longitudinal and transverse stability as well as for the desired direction and ascent and descent of the machine. (Italics supplied.) (P. 1, lines 8–16; Binder, p. 1.)

It will be recognized at once that the entire stated object of the alleged invention, except for the word which we have italicized in the foregoing quotation, is found in the prior patent to the Wrights. In addition, the Wright specification states that their invention may be embodied in a monoplane [14] (Wright patent p. 1, ls. 70–72), and the drawing shows a tail structure 23, supporting the vertical rudder 22. (Binder, pp. 26, 33.)

Thus, at the outset, it can be taken as one of the established facts in the case that the entire stated object of the patent in suit had already been disclosed and accomplished by the Wrights. In fact, the lower court found (R. 58, top) that the re-

[14] The Wright patent refers to each "wing" as an "aeroplane", and the drawing shows a "biplane."

spondent "*endeavored to* [but] did *not* solve" the problem of equilibrium or stability, which had several years previously been solved by the Wrights.

The patent in suit then goes on to state generally, and later to describe in detail, three particular "embodiments" of the alleged invention (p. 1, ls. 17–60, Binder, p. 1). To this end the patent has eight sheets of drawings, with twenty-four figures. Of the three different forms of airplane constituting "embodiments of the invention", two ("ring tail" and "tandem wing monoplane") have never been built, so far as the record discloses, and only a single machine was ever attempted according to the third ("bird tail"). That was by Esnault-Pelterie in France, in 1907, where after a number of flights it was relegated to a museum (Finding VI, R. 9). No one has since constructed any of the three forms of airplane disclosed in the patent.

The three forms or embodiments of the alleged invention are:

(1) The so-called "ring tail" construction shown in Figures 1 to 5, sheet 1 (Binder, p. 5); in Figures 1–a and 3–a, sheet 2 (Binder, p. 6); in Figure 6, on sheet 3 (Binder, p. 7); and in Figures 16, 17, 18, and 19, on sheet 8 (Binder, p. 12). It is described in the specification as follows (p. 1, lines 17–37, Binder, p. 1):

> A first embodiment of the invention comprises a single pair of distortable wings and

> steering rudders for the direction and ascent, the getting out of shape or distorting of the wings resulting in the obtaining of transverse stability and such distorting being obtained by means of subtended stay-wires suitably operated for pulling down simultaneously the fore portion of one wing and the aft portion of the other, or vice versa. The steering rudder is vertical and may be rotated about a vertical axis, while the rudder which steers the aeroplane upward or down (called for convenience the "ascensional" rudder) and which is horizontal and is integral with the vertical rudder, may be rotated about a transverse horizontal axis in such a way as to secure the longitudinal stability of the machine and allow of the ascent and descent to be effected.

(2) The so-called "bird tail" construction shown in figure 10, sheet 3 (Binder, p. 7); in figures 7 and 8, sheet 4 (Binder, p. 8); and in figures 7–a and 8–a, sheet 5 (Binder, p. 9). This is described in the specification as follows (p. 1, lines 38–52; Binder, p. 1):

> A second embodiment of the invention comprises a pair of distortable wings arranged in the same manner as in the previously described construction, and a single horizontal rudder or tail capable of pivoting about a horizontal longitudinal axis and also about a transverse horizontal axis. This

> last rudder or tail has the functions of the vertical and horizontal rudders previously described, and when pivoting about the longitudinal axis controls the direction of the machine, whereas, when pivoting about the transverse horizontal axis, it effects the ascent and descent of the machine or holds it level.

(3) The "tandem wing monoplane" construction, like Esnault-Pelterie's 1906 French patent, shown in figure 9, sheet 4 (Binder, p. 8) figure 9a, sheet 6 (Binder, p. 9). Of this the specification says (p. 1, ls. 53–60; Binder, p. 1):

> A third embodiment of the invention comprises two pairs of wings both distortable, but one of such pairs of wings is so mounted as to be capable of pivoting about a horizontal longitudinal axis like the tail or rudder of the previously described modification, with a view of so steering the machine in either direction.

A system of *vertical* levers or handles may be employed for operating the controls of the first two modifications. These control levers are, we submit, simply a *vertical* arrangement of the *horizontal* levers 22 and 23 of Esnault Pelterie's 1906 French patent. The third "embodiment" of the alleged invention may, in fact, be operated by the two horizontal levers of the 1906 French patent, "or in *any other* suitable way."

Referring to figure 6 (Binder, p. 7), the right-hand handle or lever 61 is, in function and operation, like the right-hand handle or lever 22 of Esnault-Pelterie's 1906 French patent (Binder, p. 195), the subject-matter of which was dedicated to the public in this country. The two levers differ only in that lever 61 of the patent in suit is *vertical,* while lever 22 of the prior patent is *horizontal.* In the patent in suit, moving the lever 61 to the *left* rolls the plane to the *left,* and moving it to the *right* rolls the plane to the *right,* as in the earlier patent. Moving the lever 61 *forward* causes the plane to nose *down,* and moving it *backward* causes the plane to nose *up.*[15] The left hand lever 68 is moved *forward* to turn the airplane to the *right* and *backward* to turn the plane to the *left,* in a horizontal plane (Finding XIII, R. 17). The steering is accomplished by twisting the ring with which the lever 68 is connected by rod 69. The ring is mounted upon an *eccentrically* located ball-and-socket joint (fig. 19,

[15] Judge Campbell, in his opinion in the Eastern District of New York in the *Chance Vought* case (56 F. (2d) at p. 401, near top of 2nd column), held that such motion of the lever 61 is *less* "natural" or "instinctive" than the motion of the lever 22 in the dedicated 1906 patent, in which the lever 22 is moved *up* to go *up*, *down* to go *down*, *left* to roll *left*, and *right* to roll *right.* That plaintiff attributed "instinct" operation to the patent in suit while denying it of the *more* natural operation of his earlier patent shows, we think, that the argument is one born of expediency, not based upon merit.

Binder, p. 12) and carries both the vertical rudders 57 (fig. 1, Binder, p. 5) and the horizontal rudders or "elevators" 60 (fig. 3, Binder, p. 5). Their action is, therefore, necessarily interdependent.

The arrangement of the handles or levers 86 and 80 in figure 10 (Binder, p. 7), which shows the controls for the "bird tail" construction, is similar. Here there is a single, flat, tail member 71, which may be swung up and down about the horizontal axis 73, or tilted sidewise about its central axis which is in line with 76, 75, 74 in the longitudinal axis of the plane (p. 1, ls. 44 *et seq.;* Binder, p. 1). Considering first the lever 86, forward motion causes the airplane to pitch down, backward pull to nose up, and movement left or right causes the machine to roll correspondingly. The lever 80, when moved left or right, steers the plane by twisting the tail 71 "in a bird-like manner", which signifies turning it about the longitudinal axis 74 in the bearing 75 (p. 3, ls. 26–27; Binder, p. 3).

Almost hopeless confusion of the "bird tail" controls will thus be seen to result from the fact that the rudder response is "*inverted*" (reversed) when the tail passes through its normal or "neutral" position. Thus, if, in making a turn, the lever 86 is *forward,* moving the lever 80 to the *left* steers the plane to the right, and moving the lever 80 to the *right,* steers the plane to the *left;* if, however, the lever 86 is pulled *back* past the vertical,

the rudder responses become just the opposite, and the pilot must instantaneously shift the lever 80 in the opposite direction, if he desires to keep on turning in the *same* direction. That is, to steer to the *left* the pilot sometimes moves the lever 80 to the *right,* and sometimes to the *left,* depending upon the position of lever 86. This is apparent from the fact that both the levers 80 and 86 act directly upon the same "bird tail" 71, as shown in the drawing. (See also, Finding XIV, R. 19.)

The "third embodiment" of the patent in suit (p. 1, l. 53; Binder, p. 1), the "tandem wing monoplane" (Figs. 9 and 9–a; Binder, pp. 8, 10), has no vertical or horizontal (elevator) rudders at all. It is only very briefly referred to in the specification (p. 3, second column, ls. 70–82; Binder, p. 3). It has two pairs of distortable wings, but their control system, if any, is not described beyond the statement that both pairs of wings "are distortable and may be effected the same as in the previously described constructions ('ring tail' and 'bird tail'), *or in any other suitable way.*" Certainly, there is no emphasis in that upon the desirability of any particular form or arrangement of handles or levers, whether vertical or horizontal, and the fact is that this third embodiment of the "invention" is the same as Fig. 3 of Esnault-Pelterie's third French patent (Binder, p. 203; Findings V and VII, R. 8, 10) which states that the "system of control" may be that of his 1906

French patent, that is, the two *interdependent, horizontal* levers. Their interdependency is expressly found by the court below (Finding IV, R. 7–8). This construction of the third French patent, hence of the patent in suit, in its "third embodiment", was said by the lower court to be "*predicated upon a false scientific basis* as to the structural features of a successful airplane, and the reaction of essential elements to the air in order to secure equilibrium" (R. 59).

Thus of the three "embodiments of the invention" disclosed in the patent in suit, the first, or "ring tail", steers *left* or *right* by *forward* and *backward* motion of the steering lever; the second, or "bird tail", steers left or right sometimes in response to the *corresponding,* and sometimes in response to the *opposite,* motion of the steering lever, depending upon the position of the other lever; and the third form, or "tandem wing", is controlled, for pitch, roll, and steering, by the two interdependent *horizontal* sticks "predicated upon a false scientific basis" as in the patentee's first French patent of 1906.

A fundamental and self-evident fact with respect to the patent in suit is that in both the "ring tail" and "bird tail" embodiments, as well as in the "tandem wing" embodiment, the control over the machine exercised by the two levers, 61 and 68 (Fig. 6; Binder, p. 7) or 86 and 80 (Fig. 10; Binder, p. 7), is *not independent* (Finding XIV,

R. 19). Operation of either lever affects the "organ" actuated by the other. *"Pitch"* and *"steering"*—that is, vertical and horizontal motion—can not be controlled by either lever alone. In the "ring tail" construction, the vertical rudders (57 in Fig. 1; Binder, p. 5) for steering in a *horizontal* plane, and the horizontal rudders or "elevators" 60 (Fig. 3; Binder, p. 5) for steering *up and down,* are rigidly mounted on the same ring. While performing any maneuver, movement of the left hand lever 68, intended for steering in the *horizontal* plane, affects the *pitch* of the machine, and movement of the lever 61, intended for controlling the *pitch,* affects steering by producing an undesired "yaw." The same is true with respect to the "bird tail" construction shown in Figure 10 (Binder, p. 7). The levers 80 and 86 both act upon *the same surface,* 71, and their operation is so interdependent that the action of 80 is *reversed* when 86 passes through "neutral" (i. e., the vertical position), as just explained.[16]

Even the most eulogistic description of the respondent's machine recognizes the fundamental interdependence of the stabilizing and steering controls, "like in the Wright machine" (R. 9), in

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[16] In the "ring tail" the ring is hung *eccentrically* upon a ball and socket joint (Fig. 5, Fig. 19), and the operating rod 69, Figure 6, is attached to the ring at the point 70, *also eccentric,* as best shown in Figure 19. This accentuates the inherent interaction of the two controls.

which the rudder was tied to the wing-warping control by a cable.

The Circuit Court of Appeals for the Second Circuit in *Esnault-Pelterie* v. *Chance Vought Corp.*, 66 F. (2d) 474, 478, held as follows:

> Assuming the validity of the patent in suit, it must be limited to the structure disclosed employing the bird tail or ring tail unit for control about the longitudinal and vertical axes with a restricted range of equivalents.

If the claims are so limited and restricted, admittedly there would be no infringement by the Government airplanes.

The courts have not infrequently inserted as a limitation into a claim an element which was disclosed in the specification and which was obviously an indispensable or essential feature of the invention, particularly if, as here, that was a measure of the actual advance made by the patentee over the prior art. In other cases this has been done in order to save a claim from an adjudication of invalidity. *Sargent* v. *Hall Safe and Lock Company*, 114 U. S. 63, 73, 85; *Snow* v. *Lake Shore and Michigan Southern Railway Company*, 121 U. S. 617, 618, 622, 629–630; *Holland Fur. Co.* v. *Perkins Glue Co*, 277 U. S. 245, 256.

III

The Vertical Control Lever Did Not Constitute Invention Over the Structure Disclosed in the Respondent's 1906 French Patent

As has been heretofore pointed out, the respondent applied for his first patent in France on December 19, 1906 (Finding III, R. 6). His application in this country was not filed until January 16, 1908—more than twelve months subsequently to the French filing date. Consequently, under Section 4887 of the Revised Statutes (U. S. Code, Title 35, Section 32), the respondent was barred from receiving in the United States a patent on the alleged invention disclosed by the first French patent.[17]

The Court of Claims properly held that "because of this section of the statutes it would be impossible for plaintiff to obtain a monopoly under the United States patent for the same invention disclosed in its [sic] first French patent, but the statute does not preclude him from obtaining a monopoly by virtue of the United States patent for an invention which differs from or is a patentable improvement upon the structure disclosed in its [sic] first patent" (R. 47, 48).

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[17] R. S., Sec. 4887 (U. S. Code, Title 35, Sec. 32), provides that no person shall be barred from receiving a patent in the United States unless the application for the first patent was filed more than twelve months prior to the filing of the application in this country, in which case no patent shall be granted in this country.

The Circuit Court of Appeals for the Second Circuit held to the same effect. *Esnault-Pelterie* v. *Chance Vought Corporation,* 66 F. (2d) 474, 475.

At that point, however, the two courts parted company, the Court of Claims holding that there was a patentable difference between the vertical control lever and the structure disclosed in Esnault-Pelterie's first French patent, while the Circuit Court of Appeals for the Second Circuit concluded that the plaintiff's inventive act was exhausted in his earliest application, and that the vertical lever was a nonpatentable improvement on, or modification of, his first structure. It is submitted that the result reached in the Second Circuit was correct.

The respondent's first French patent showed two horizontal levers. (Fig. 4; Binder, p. 195). The right hand lever was so constructed as to be capable of motion in all directions. The longitudinal position of the machine was controlled by raising or lowering the lever, while its transverse attitude was controlled by manipulating the lever to the right or to the left. An oblique movement affected both the longitudinal and transverse position. The lever was raised in order to cause the machine to rise and vice versa. The airplane rolled to the right when the lever was pushed to the right and vice versa. The left hand lever was employed to steer the craft (Finding IV, R. 7).

The court below characterized the horizontal levers of respondent's 1906 French patent, which he first tried to patent here (R. 10; 47), as "evidently predicated upon a false scientific basis" (R. 59), and said that "plaintiff's scientific knowledge *immediately* disclosed to him the *fatal defects* in his *first* French patent [that of 1906], and he *promptly* abandoned it. No such device was ever constructed, and, *almost immediately following*, the vertical lever mechanism came into existence" (R. 59).

Respondent's first French patent, with the *horizontal* levers, was applied for December 19, 1906, and the "almost immediately following" second and third French patents, showing vertical levers, were applied for January 19 and January 22, 1907, respectively (Finding III, R. 6–7).

But neither the "evidently false scientific basis" of his first French patent (R. 59), nor the fact that "plaintiff's scientific knowledge immediately disclosed to him the fatal defects" thereof (R. 59), nor his prompt abandonment of the horizontal levers in favor of vertical ones (R. 59), appears to have deterred the respondent from endeavoring to patent in this country the arrangement of horizontal handles which he is said to have long before abandoned in France.

The lower court expressly found that on December 10, 1907, some eleven months after his scientific knowledge had disclosed to him the fatal defects of his first French patent (R. 59), the respondent, at Paris, nevertheless "signed and

took oath to an application for United States patent" (R. 10, top), which was forwarded to his attorneys in New York and which included the drawings and specifications of his *first* French patent (Finding III, R. 10).

The second and third French patents and the United States patent disclosed the same pair of levers utilized for the same purpose, except that they were mounted in a vertical rather than in a horizontal position. (Binder, pp. 202, 209.) We submit that this change in the position of the levers from the horizontal to the vertical was not invention, but a mere mechanical alteration which was outside of the purview of the patent laws. *Atlantic Works* v. *Brady*, 107 U. S. 192, 199–200.[18]

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[18] The opinion in *Atlantic Works* v. *Brady*, cited in the text, contains the following succinct summary of the pertinent principles:

"The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head-workmen and engineers is generally adequate to devise and which, indeed, are the natural and proper outgrowth of such development. Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle, and injurious in its consequences.

"The design of the patent laws is to reward those who make some substantial discovery or invention which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favor. It was never the object of those laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would nat-

This was the conclusion reached in the Second Circuit (*Esnault-Pelterie* v. *Chance Vought Corporation*, 66 F. (2d) 474, 477). Judge Manton summarizes the ruling as follows:

> The advantage found or claimed by the appellant for both the French patent No. 372,753 and the patent in suit is the same; that is, the whole equilibrium or balance of the machine may be controlled by the pilot with one hand. The structure of the French patent was operative, and could be applied to a modern plane for control. Fig. 9 of the patent in suit embodies one form of the invention and is substantially identical with Fig. 2 of the French patent No. 372753 and Fig. 3 of the French patent No. 373818; the only difference being that the rigid wings of the French patent No. 372753 have become warpable for lateral control instead of being rotated about a transverse axis, and also one of the wings has been converted into a bird tail for rotation about a longitudinal axis to simulate bird flight.

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urally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement and gather its foam in the form of patented monopolies which enable them to lay a heavy tax upon the industry of the country without contributing anything to the real advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith."

> In French patent No. 373818 the aeroplane of Fig. 3 is described as similar to the one which formed the subject-matter of French patent No. 372753, and it is stated that the same control mechanism, which includes the horizontal lever, may be employed for controlling the machine. In both the French patent No. 372753 and the patent in suit, appellant makes the same choice of putting longitudinal and lateral controls under one lever and putting the directional control under another, and the only difference here is the vertical position of the sticks instead of the horizontal position of the early French patent No. 372753.

The structure covered by Esnault-Pelterie's first French patent, No. 372753, is in the public domain, so far as the United States is concerned, in view of the fact that no patent was applied for in this country within twelve months after the French filing date. If, as we contend and as the Circuit Court of Appeals for the Second Circuit held, the structure covered by the second and third French patents and by the United States patent, is not patentable as compared with the earlier structure and constitutes only a mechanical modification of the latter, the patent in suit must be held void. *Underwood* v. *Gerber,* 149 U. S. 224; *Toledo Scale Co.* v. *Computing Scale Co.,* 9 F. (2d) 823, 824.[19]

[19] In *Olmsted* v. *Andrews*, 77 Fed. 835, 839, it was held that it is not "invention to cause a device to work vertically that theretofore operated horizontally."

IV

The Claims of the Patent in Suit Are Not Supported by the Disclosure

The discussion has thus far proceeded on the assumption *arguendo* that the vertical control lever was disclosed and properly claimed by the patent in suit. While the patent does in fact contain claims which, standing alone and read apart from the rest of the text and without reference to the prior art, seem to cover the single vertical lever used for the purpose of regulating the lateral and longitudinal attitudes of an airplane, the description and the drawings do not in fact disclose or show such a mechanism. The claims in question, as will be shown hereafter, were introduced into the application about five and one-half years subsequently to its filing date and after the use of the vertical control lever had become common in aeronautics.

It is, of course, fundamental that the claims of a patent must be fully supported by the disclosure and that a claim not so justified is void. *Knox* v. *Quicksilver Mining Co.*, 4 Fed. 809; *Fulton Co.* v. *Powers Regulator Co.*, 263 Fed. 578, 580; *Westinghouse Electric & Manufacturing Co.* v. *Metropolitan Electric Manufacturing Co.*, 290 F. 661, 664.

The patent in suit does not disclose a single vertical lever for the purpose of controlling the apparatus that governs the longitudinal and lateral

positions of the airplane. It is quite apparent that at the time he filed his application the respondent did not contemplate such a mechanism. The apparatus that he evidently had in mind and which he disclosed to the world, was a combination of two cooperating and co-acting levers connected with an integral tail surface or with radially rotating wings. The right hand lever was to be used for the purpose of governing the lateral and the longitudinal equilibrium of the craft, while the left hand lever was to be used for steering. But since the same tail surface acted as both an elevator and a rudder, and since the right hand and the left hand levers were connected with it, it was necessary to operate the levers in conjunction with each other. Otherwise it would not have been possible to steer the airplane without also causing it to ascend or descend and vice versa (Findings XIV–XVI, R. 19–21).[20] We have heretofore shown in detail the interdependence of the two levers in the Esnault-Pelterie patent (see pp. 51–59, *supra*) and will not reiterate that discussion.

As shown in the findings, Esnault-Pelterie built but one airship embodying his peculiar and impracticable control apparatus.

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[20] The findings indicate that the device disclosed by the patent in suit was operative. (Finding XVII, R. 21.) This fact is not disputed, but is not germane. The question at issue on this branch of the case is not whether the respondent's device is operative, but whether it is the structure and functions in the manner indicated by the claims.

The "joy stick" or vertical control lever, on the other hand, is an entirely different type of mechanism, for it operates independently of other apparatus. The claims, if construed, as the respondent attempts to read them on the control lever find no support in the disclosure and cannot be considered valid. They constitute an attempt to secure a monopoly on something which the patentee did not invent, or, disclose to the public.

V

The Patent Is Invalid by Virtue of the Fact That the Claims on the Control Lever Were Not Inserted in the Application Until Five and One-half Years After Filing, While the Device Came Into General Use in the United States Prior to That Date

The application for the patent in suit was filed on January 16, 1908 (Finding VII, R. 10). The original claims did not contain any reference to the vertical control lever (Finding VIII, R. 10). They were directed to other features of the disclosure. Thus, Claim 1 related to a peculiar construction of the warping wings. Claims 2, 3, 5, and 6 related to the unique integral structure of the tail surfaces. Claim 4 attempted to cover the use of two separate levers, without indicating whether they were horizontal or vertical. Claims 7 and 8 related solely to structural details.

The prosecution of the application was extremely dilatory, as though the applicant desired to keep the application pending for as long a time as pos-

sible. On March 10, 1908, less than two months after the filing of the application, the examiner rendered his first action requiring certain changes. (Binder, p. 58.) On February 1, 1909, almost eleven months later, the plaintiff presented an amendment. The applicant's attorneys inserted three new sheets of drawings, canceled one of the original sheets, and directed the patent office to "*erase the specification and claims* (not including signing clause and signatures)", and inserted an entire new specification and claims. (Binder, p. 59.) For all that appears from any oath ever filed by the applicant, everything that was thus inserted on February 1, 1909, and thereafter (which comprises the entire specification, all the claims, many of the drawings, and the entire matter of instinctive response—in fact, the whole description except the "*signing clause and signatures*")—was "his lawyer's contrivance." Being inserted by amendment, it required an oath which the plaintiff "might have found it difficult to take, and for want of it the patent is void. Rev. Stat., Sec. 4892." (*Steward* v. *American Lava Company,* 215 U. S. 161, at pp. 166, top, 68). The patent is void on that ground.[21]

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[21] By cancellation of the original claims upon rejection by the Patent Office, Esnault-Pelterie admitted that he was *not* the inventor of the *only* claims to which he ever made oath. The patent is void on authority of *Cutter Co.* v. *Metropolitan* (C. C. A. 2d) 275 Fed. 158, at page 162 top, where the court rules almost the identical point, following the *Lava* case.

In the "substitute specification and claims" inserted by the amendment of February 1, 1909, the new claims included two (originally number 12 and 13, renumbered 11 and 12, and again renumbered 7 and 8, and finally canceled) one of which (Claim 7) we quote below. Had these claims of 1909 been granted in the patent, they would, in terms, have embraced the petitioner's accused machines. Their subsequent cancellation upon rejection, accompanied by acceptance of the more restricted claims in suit, which exclude the petitioner, is, therefore, necessarily fatal to respondent's charge of infringement. One of the canceled claims is as follows (Binder, pp. 71, 75, 78, 79, 89, 93, 96, 98):

> 7. An aeroplane having means for *controlling* its inclination and a single lever for operating said means to *control* both the *longitudinal* and the *transverse* stability of the apparatus, said lever being arranged to oscillate in different vertical planes, means for transmitting its movement in one plane to the means for *governing* the longitudinal inclination, and means for transmitting its movement in the other plane to the means for *determining* the transverse stability. (Italics supplied.)

The point is, that the canceled claim specifies "means for *controlling*" the inclination of the plane and a lever "for operating said means to *control* both the longitudinal and transverse stability", and to transmit the motion of the lever to the "means for *governing* the longitudinal inclina-

tion" and to the "means for *determining* the transverse stability." These are broad terms, inclusive of both "producing" and "counteracting" or overcoming" stability. But after cancellation of this claim, and its companion, upon rejection by the Patent Office, claims of limited scope were inserted instead (those here in suit), in which the levers are specified as being for "*producing*" or "*maintaining*" lateral and longitudinal stability. In petitioner's constructions, the inherent stability of the plane is "overcome" or "counteracted" by moving the levers, but is "produced" and "maintained" by the built-in characteristics giving inherent and automatic stability. Thus, while petitioner's planes were, in terms, responsive to the canceled claims, rejected by the Patent Office, they certainly are not to the limited claims later inserted, and now in suit—for the reasons explained in detail hereafter (pp. 85 et seq.).

Within a month—on March 2, 1909—Claim 13 was rejected for lack of invention because of the French patent to Laroze.[22] (Binder, p. 75.) Twice the respondent requested a reconsideration of this ruling, but on May 10, 1910, and again on May 27, 1911, the examiner reiterated his rejection. (Binder, pp. 88, 96.) On May 23, 1912, the plaintiff acquiesced in this decision and withdrew Claim 13 from the application. (Binder, p. 98.)

On June 12, 1913, almost thirteen months later and nearly five and one-half years after the filing

[22] The Laroze patent is discussed above, pages 28 et seq.

of the original application, the claims involved in this litigation, other than Claim 2, were inserted by amendment, and after some exchange of correspondence were finally granted (Binder, pp. 105, 115). The patent issued on November 3, 1914 (Findings VIII, IX, R. 10–13).

During the prosecution of the application, numerous modifications and additions were made in the drawings. None of them was verified by the applicant's oath.

On each occasion, Esnault-Pelterie consumed the full statutory time permitted him for amending his application, while the Patent Office in each instance made a very prompt reply. This is significant because, beginning in 1910, the public in this country was using the mechanism which is now asserted to have been his invention (R. 32, Finding XXXVIII).

Long before the present claims were inserted in the application, the vertical control lever came into general use, both in France and in the United States. Thus, it appears that airplanes manufactured by Bleriot and Farman in France containing the vertical stick control, were brought to the United States in 1910 and 1911 and were used in exhibition flights (Finding XXXVIII, R. 32). It can hardly be supposed that the patentee, who admittedly was very active in aviation, was not aware of this development. The courts assiduously and zealously guard the public against the enlargement of the scope of a patent application during its

pendency in the Patent Office. This rule is indispensable and vital for the protection of the public against unjustified and unauthorized monopolies. Without it, inventors, by introducing subsequent developments into a patent application, might be in a position to get the benefit of the earlier date for a later invention. Moreover, they might consciously or unconsciously be influenced by devices which they saw enter into commercial or industrial use after the filing of the application.

The necessity for the application of this rule clearly appears in the case at bar. Suppose on June 12, 1913, the plaintiff had filed an original application for a patent on the vertical control lever, instead of adding claims to cover that device to the application which he had filed in 1908. The Patent Office would undoubtedly have rejected the claims, for as has been shown above, the vertical control lever had come into general public use several years previously. In 1913 this apparatus even in its application to airplanes involved no novelty. By using the amendment process, however, Esnault-Pelterie seeks the benefit of the 1908 date. We submit that this result should not be countenanced.

The authorities are clear that under the circumstances just discussed, the claims should be declared invalid.

In *Railway Co.* v. *Sayles*, 97 U. S. 554, the patent application, which related to a railroad brake, was

filed in June 1847. The claims were rejected by the Patent Office. Five years subsequently to the original filing date the applicant modified and enlarged his application by amendment and in 1852 a patent was granted. During the intervening period the art had been rapidly developing. The patent was held invalid. The opinion contains the following observations on the point here under discussion (p. 563):

> Courts should regard with jealousy and disfavor any attempts to enlarge the scope of an application once filed, or of a patent once granted, the effect of which would be to enable the patentee to appropriate other inventions made prior to such alteration, or to appropriate that which has, in the meantime, gone into public use.

In *Eagleton Manufacturing Co.* v. *West, etc., Manufacturing Co.*, 111 U. S. 490, there was involved a patent on furniture springs. The application in its original form purported to cover a process of producing furniture springs known as "japanning." Later, by amendment, the applicant set forth the discovery that the application of heat would impart temper to the springs. The court held that the enlarged claims could receive no consideration, and that the validity of the patent should be adjudicated on the basis of the original form of the application. The conclusion was further reached that the application as first filed did

not disclose any patentable invention and that, therefore, the patent was invalid.

In *Steward* v. *American Lava Co.*, 215 U. S. 161, there was presented for adjudication the validity of a patent on a tip for an acetylene gas burner. The application in its original form referred to the forcing of gas through contracted openings at great pressure in order to produce a hollow shaped funnel flame. In an amended specification the applicant pointed out that the essence of his apparatus was to provide so short a chamber or cylinder as to prevent the mixing of the air taken into it, and to emit the current of gas surrounded by the greater part of such air as an envelope or film. It was held that this enlargement of the application was not entitled to consideration.

These principles have not infrequently been applied by the lower courts, *Cramer Manufacturing Co.* v. *Nims Pump Co.*, 9 F. (2d) 914; *Victor Talking Machine Co.* v. *Brunswick-Balke-Collender Co.*, 8 F. (2d) 41, affirmed, 273 U. S. 670; *Kintner* v. *Atlantic Communication Co.*, 230 Fed. 829, affirmed, 240 Fed. 716;[23] *A. Schrader's Son, Inc.* v. *James Martin Corp.*, 294 Fed. 620; *Hestonville, etc., Railway Co.* v. *McDuffee*, 185 Fed. 798, 802.

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[23] In this case the court took occasion to point out that in the early stages of an art, vigilance must be exercised to prevent a result by which after-acquired knowledge gives to a patentee that valuable control which would not have been his but for a later or a newly expressed thought which he seeks to antedate.

VI

The Respondent, by Acquiescing in the Rejection of Claim 13 Is Estopped From Asserting That the Claims of the Patent in Suit Should Be Construed to Cover the Vertical Control Lever

As we have pointed out, Claim 13, which was rejected on March 2, 1909, on the French patent to Laroze, was intended to cover the vertical control lever (Finding VIII, R. 12). The claim read as follows:

> An aeroplane having means for controlling its inclination and *a single lever for operating said means to control both the longitudinal and the transverse stability of the apparatus; said lever being arranged to oscillate in different vertical planes,* means for transmitting its movement in one plane to the means for governing the longitudinal inclination, and means for transmitting its movement in the other plane to the means for determining the transverse stability, said lever being mounted to permit also an oblique movement having components in each of said planes so as to actuate simultaneously the means for establishing longitudinal stability and that for establishing transverse stability. (Italics added.)

The applicant did not choose to avail himself of the right granted to him by law to appeal from the decision of the examiner after the latter declined on reconsideration to reverse his ruling. On the contrary, the applicant acquiesced in the exam-

iner's determination and on May 23, 1912, cancelled the claim. Almost thirteen months later, on June 12, 1913, he filed a new set of claims, among which are the claims involved in this litigation. (Binder, p. 105.)

The law is clear that the applicant, having acquiesced in the examiner's rejection of the original claim without prosecuting an appeal from his ruling, is bound by the decision and is estopped from asserting that claims introduced and allowed subsequently should be given the same construction as the claim that had been previously disallowed and cancelled. On that basis the patent in its present form may not be construed to cover the vertical control lever. A situation identical with that involved in the case at bar was presented in *Morgan Envelope Co.* v. *Albany Paper Co.*, 152 U. S. 425, 429. The patent dealt with a means for packing tissue paper in the form of a continuous band of oblong or oval shape. The claim was rejected as indefinite as well as because it was anticipated by prior art. The applicant amended his application by modifying his claim. The court indicated that the modified claim read as broadly as the original claim, but nevertheless held that it could not be construed to apply to the construction covered by the claim that had been previously rejected. Mr. Justice Brown stated:

> But the patentee having once presented his claim in that form, and the Patent Office

> having rejected it, and he having acquiesced in such rejection, he is, under the repeated decisions of this court, now estopped to claim the benefit of his rejected claim or such a construction of his present claim as would be equivalent thereto. *Leggett* v. *Avery,* 101 U. S. 256; *Shepard* v. *Carrigan,* 116 U. S. 593; *Crawford* v. *Heysinger,* 123 U. S. 589, 606; *Union Metallic Cartridge Co.* v. *United States Cartridge Co.,* 112 U. S. 624.
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> It is true that these were cases where the original claim was broader than the one allowed, but the principle is the same if the rejected claim be narrower. Why the claim of the present patent was allowed after the rejection of the narrower claim does not appear. The objections made to the claim as originally presented seem to be equally applicable to this.

The same principle was more recently applied in *I. T. S. Rubber Co.* v. *Essex Rubber Co.;* 272 U. S. 429, 443, and *Smith* v. *Magic City Kennel Club,* 282 U. S. 784, 789.

The court below in its opinion calls attention to the fact that Claim 2, which was introduced into the application on February 1, 1909, remained in the case continuously during the Patent Office proceedings and constitutes Claim 2 in its present form (R. 56). That claim reads as follows (R. 12):

> An aeroplane having distortable wings for maintaining transverse stability, a rud-

> der for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder.

The claim is not limited to a vertically disposed lever, but is sufficiently broad to cover a lever located in any position whatsoever—horizontal, vertical, or otherwise. This claim is clearly void, in view of the fact that it is anticipated by Esnault-Pelterie's first French patent, which showed a horizontal control lever.[24] As was held both by the Court of Claims in this case and by the Circuit Court of Appeals in the *Chance Vought Corporation* case, the patent in suit can be sustained, if at all, only if it covers a structure that is patentably different from that disclosed in Esnault-Pelterie's earliest French patent, since in the United States that structure is in the public domain.

VII

Esnault-Pelterie was not the Inventor of the Airplane Control Lever

The facts clearly indicate that Esnault-Pelterie was not the inventor of the modern airplane control lever. As early as 1904—almost three years before the respondent filed his first French application—Captain Ferber used a single horizontal lever for operating the elevator and for steering the airplane (Finding XLI, R. 34). Even prior to

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[24] See pages 60–65, supra.

that—between 1901 and 1903—Bleriot had constructed an airplane in which the control system was operated by a horizontal lever mounted on a universal joint (Findings XLII, XLIII, XLVI, R. 35–37). By formal recitals contained in a contract made between Esnault-Pelterie and Bleriot, on November 1, 1911, Esnault-Pelterie solemnly admitted that Bleriot was the prior inventor of the mechanism. The contract states: "Mr. Bleriot has been able to prove to Mr. Esnault-Pelterie that he was in prior, legitimate, and personal possession of the invention—that is to say, of the single lever mounted on a cardan [i. e., universal] joint * * *" (Finding XLIV, R. 36).

Article III of the contract provides as follows (R. 36–37):

> By reason of the legitimate and prior possession strictly limited to the person of Mr. Bleriot, the latter will be able to provide his machines with his arrangement of a single bell lever without paying any royalty to Mr. Esnault-Pelterie, or, in other words, he will have the free use of his invention for all the levers with which his apparatus shall be provided and for all those that he will furnish directly to the private industry.[25]

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[25] Throughout this litigation much has been made by the respondent's counsel of the fact that Esnault-Pelterie's French patents were held valid in that country. In view of the differences between the French and the American patent law, however, that fact does not justify an inference that the French courts held Esnault-Pelterie to be the first inventor. While in the United States a patent is awarded only to the

Bleriot had proved, to the satisfaction of the respondent, that Bleriot had himself, as early as 1901–1903, constructed a flying machine having a "cardan" or universally mounted lever, with handles at the end, for operating an integral horizontal and vertical rudder, such as the integral "ring" and "bird" tails of the patent in suit. This was established to respondent's admitted satisfaction by a letter written in February 1911 by one Vautrin, the mechanic who built the machine for Bleriot, to respondent's French attorney, Armengaud. As a result of this evidence, on November 1, 1911, three years before the grant of the United States patent in suit, respondent entered into an agreement with Bleriot to pool their French patents to the end that, between them, they should "secure * * * the ownership of the single lever control of the organs of stabilization in air-

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first and original *inventor*, in France the patentee need not be the first inventor. In that country the *first applicant* is entitled to a patent, provided the invention had not previously been disclosed in a printed publication. The purpose of the French patent law is to reward the person who first discloses the invention to the public rather than the person who first makes the invention. A person who can show that he made or practiced the invention prior to the time that the patentee filed his application for a patent is entitled to a free license, but this circumstance does not invalidate the patent. Consequently the fact that Bleriot had a free license to use the invention is in itself an indication that he either made or practiced the invention before Esnault-Pelterie applied for his patent.

planes" (R. 36), in an effort to levy toll upon the French aircraft industry.[26]

This contract recited that, by proofs accepted by respondent, Bleriot had been able to prove to respondent that Bleriot "was in *prior, legitimate,* and personal possession *of the invention*—that is to say, *of the single lever mounted on a cardan* [universal] *joint*" (R. 36). They then went on to arrange for the division between them of whatever royalties they might be able to collect for the use, by the French aircraft industry, of "the single bell levers mounted in cardan (universal joint)" (R. 37, Article IV).

The lower court dismissed the Bleriot defense on the ground that the phrase "in prior, legitimate, and personal possession of the invention" is a term of art in the French patent law, which "indicates the secret possession of knowledge legitimately obtained and is not an admission of priority of invention" (R. 69), and that there was no evidence to show *what* knowledge, if any, the respondent had of Bleriot's work "on January 19, 1907, the effective filing date of the patent in suit" (R. 69).

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[26] It must be remembered that respondent was *then* asserting his first or *horizontal* lever French patent of 1906 in France as the basic or fundamental one in the suits there and treated his second and third French patents (to which the United States patent in suit is said to correspond) as for "*minor mechanical variations*" of the 1906 patent; *Esnault-Pelterie* v. *Chance Vought*, 66 F. (2d) 477, bottom of 2d col., p. 478, top.

But this, we think, entirely misses the point. The real point is, we urge, that at least as early as 1911 the respondent *knew,* and *admitted,* that Bleriot was the first inventor, hence that respondent was *not* the first inventor of the alleged invention—at least so far as the universally mounted ("cardan") control lever is concerned. In the terms of the admission made in the contract (R. 36, Finding XLIV), Bleriot was admitted by the respondent to be the first inventor of "* * * *the invention*—that is to say, of the single lever mounted on a cardan joint * * *"—without reference to whether the lever was horizontal or vertical. That was a formal admission by the respondent, solemnly made in a written instrument dated November 1, 1911. It is fatal to the patent, because, under the United States statute (R. S. Sec. 4920), it is a complete defense to a patent to show that the patentee "was not the original, and first inventor." *Alexander Milburn Co.* v. *Davis-Bournonville Co.,* 270 U. S. 390, at p. 401, near bottom (opinion by Mr. Justice Holmes).

It was not until June 1913 that claims 5 to 8 of the patent in suit were presented to the United States Patent Office, and claim 9 was first presented a year after that. When those claims were presented, respondent knew, because he had previously solemnly admitted, in writing, that he was *not* the first inventor of their subject-matter. Hence respondent is demonstrated (since he admitted it), to

have known, prior to asserting claims here in suit, that he was *not* the first inventor of *"the invention."* And, on any construction, he *knew* that he was not the first inventor of the subject-matter of claim 2 in suit when he canceled and then reasserted it in 1913. Perhaps this accounts for the fact that none of the claims in suit are covered by the oath of the inventor; they were drawn by his solicitors and filed by them as amendments. Respondent never went so far as to swear that he was the first inventor of the subject-matter of any of them. Such an oath he "might have found it difficult to take, and for want of it the patent is void"; *Steward* v. *American Lava Co.,* 215 U. S. 161, at p. 168, near bottom.

In any event, by the written admission of the respondent he has known since prior to 1913, when the claims in suit were inserted in the application, that at least one, and we think all, of the claims in suit are invalid. *But there has never been any disclaimer.* Failure to disclaim a claim admittedly known for *twenty-three years* to be invalid is certainly such an "unreasonable delay" as to invalidate the whole patent.[27] *Ensten* v. *Simon, Ascher*

[27] The petitioner has contended that prior discovery and prior use of the invention does not affect the validity of the patent in suit in view of the fact that they took place in a foreign country (R. S., Sec. 4923; U. S. Code, Title 35, Sec. 72). It is highly doubtful, however, whether it can be said to be within the intendment of the statute that prior use in a foreign country should not bar the issuance of a patent to a citizen of the same country as that in which the use took

& Co., 282 U. S. 445, at pp. 452–453; *Altoona Publix Theatres* v. *American Tri-Ergon Corp.*, 294 U. S. 477, at p. 493, middle.

VIII

The Patent in Suit Has Not Been Infringed by the Petitioner

The alleged infringing airplanes are all fundamentally different from those of the patent in suit in means, operation, and result. As regards stability and control they are virtually the *antithesis* of the machines of the patent.

For infringement to exist it has long been settled that the petitioner must have substantially the same (or equivalent) *means,* operating in substantially the same *way,* to produce substantially the same *result* as the patent in suit. *Cimiotti Unhairing Co.* v. *American Fur Refining Co.*, 198 U. S. 399, at p. 414; *Kokomo Fence Machine Co.* v. *Kitselman;* 189 U. S. 8, at p. 24; *Westinghouse* v. *Boyden Power Brake Co.*, 170 U. S. 537, 568.

Petitioner's planes do not have the substantial identity of means, operation, or result which is a condition precedent to a finding of infringement.

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place. The Act was intended purely for the protection of American inventors against evidence of prior use abroad and should be construed in accordance with its spirit. See *United States* v. *Kirby*, 7 Wall. 482, 486; *Church of the Hold Trinity* v. *United States*, 143 U. S. 457; *Ozawa* v. *United States*, 260 U. S. 178, 194; *Barrett* v. *Van Pelt*, 268 U. S. 85, 90; *Helvering* v. *New York Trust Co.*, 292 U. S. 455, 464.

The claims in suit do *not* find even verbal or literal response in the planes which are charged as infringements. Moreover, as shown heretofore, during prosecution of the application for the patent in suit respondent acquiesced in the rejection of broader claims, which might have applied to the accused machines, and accepted in their stead the claims in suit, each of which is expressly limited to exclude the petitioner's constructions.

It is found as a fact (R. 15, Finding XI) that "an airplane may be built with a certain amount of transverse and lateral [sic., longitudinal] stability inherent in its structure." "By virtue of these lateral and longitudinal stabilizing tendencies, a plane in normal flight, when its attitude is disturbed by a gust of air, will of itself tend to regain its normal attitude *without any manipulation of the controls by the pilot*" (R. 16, top). (Italics added.)

This inherent transverse stability is built into the plane by giving to the wings a "dihedral" angle (R. 15, bottom); that is, looking at the plane head-on, instead of making the wings flat from tip to tip, they are lower at the center than at the tips, to form a very broad, flat "V." This is, of course, inherent in the construction of the plane and is not under the control of the pilot. It has been known for years (cf. Penaud & Gauchot patent discussed *supra,* p. 31), but is not disclosed or suggested in the patent in suit.

Inherent longitudinal (up-and-down) stability may be built into an airplane by the *fixed* horizontal tail surface or "stabilizer" at the rear (R. 15, bottom; 16, top). (See also drawings of petitioner's machines, Plaintiff's Exhibits 3–5, which are incorporated in the findings by reference; Binder, pp. 13–17.) This, also, has been well known in the art for years, but is not employed in any of the three embodiments of the patent in suit, or in any way suggested by it.[28]

Two other important *fixed* and inherently stabilizing elements of construction, which are shown in the drawings of the accused machines, made a part of the findings of the court below (Finding XXI, R. 23; Binder, pp. 13–17), are:

The *fixed* vertical fin at the rear of the plane, in front of the directional rudder, and above the line of thrust of the propeller. In the same manner as the fixed horizontal fin (R. 15), it is apparent that this gives both directional and lateral stability,

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[28] The lower court, in its opinion, referred to certain testimony to the effect that one of the three accused constructions (the Curtiss JN–4) "longitudinally bordered on instability" (R. 73). But there is no *finding* to that effect, and only a small part of the testimony is stated in the opinion. The lower court's *finding* on the subject is as we have stated it, that—

> * * * by providing a horizontal vane or tail surface a longitudinal stabilizing tendency is imparted to the plane (R. 15, bottom).

The accused Curtiss plane in fact has such a horizontal tail surface (Binder, p. 13). It is nowhere suggested that the Curtiss plane even bordered on instability in any *other* direction or that either of the *other* two accused planes was unstable in *any* direction.

exerting a self-righting action and maintaining the direction of the plane as well;

The "sweep-back" of the wings when viewed from above, which produces directional stability of the plane.

These two additional inherent or constructional stabilizing features are also old (cf. Penaud & Gauchot patent), but, like the dihedral angle and horizontal fin, both are conspicuously absent from all the embodiments of the patent in suit. Esnault-Pelteries's invention not only did not include them, but, as we shall show, is based upon their absence. Figure 2 of the patent (Binder, p. 5) affirmatively shows that no dihedral angle is present; figures 3, 3a, 8, 8a, 9, 9a, and 11 (Binder, pp. 5–11), all show that there is no sweep-back; and almost all the figures show that there are no *fixed* tail surfaces, either vertical or horizontal. It is not a case of inferring a negative from complete absence of disclosure; these figures *affirmatively* show that the well-known and inherent structural features for giving automatic stability are *not* employed in the patent.

In short, the patent in suit, in all its modifications and embodiments, shows an inherently *unstable* plane, in which stability and equilibrium must be *"maintained"* or *"produced"* (as the claims in suit all particularly specify) by movement of the controls. The court in the Eastern District of New York aptly summarized the matter:

> The patent in suit is directed to the production of stability *by hand instead of automatically,* and that produced by the pilot with the joy stick is the only stability produced by the patent. (Italics supplied.) (56 F. (2d) at p. 407, top of 1st column.)

And again (56 F. (2d) at p. 403, near bottom of second column):

> The patent in suit is of the *non*-stable type, and depends for equilibrium *solely* upon the manipulation of the control levers.

The same conclusion was reached by the Circuit Court of Appeals (66 F. (2d) at p. 479, bottom of 1st col. and top of second col.).

Contrasted with this, all of the accused constructions have *built-in and inherent automatic stability,* not under the control of the pilot at all.

The lower court took the Curtiss "JN–4D" as typical of the alleged infringing planes (R. 71), and we shall accordingly refer principally to it. Its control system is shown in plaintiff's exhibit 2. (Binder, p. 13.) The drawing is incorporated by reference in the findings of the court below (R. 23), and shows the structural features producing inherent stability, as well as the "controls" which may be used for overcoming the automatic stability to execute some maneuver or to hasten the automatic action if desired (R. 16). These controls are used by the pilot "sometimes to assist and at other times to oppose" (R. 16) the inherent stability of the plane.

The control surfaces which are subject to the control or operation of the pilot do *not* include any of the structural elements for "producing" or "maintaining" stability. Those are all *fixed* in the construction of the plane, and can *not* be varied by the pilot at all. He can operate the vertical and horizontal rudders, to perform evolutions, whether to assist or oppose the automatic action of the plane. The rudders normally trail straight out behind the fixed vertical and horizontal tail surfaces, and the ailerons normally trail straight out behind the tips of the wings. The vertical rudder is operated by a "rudder bar" in front of the pilot's seat, and worked by his feet. Its operation and connection is what the plaintiff would call "*contra*-instinctive" because when the pilot pushes forward with his right foot, the plane turns to the right, which is *opposite* to the direction of the pilot's movement. (R. 23.)

The horizontal rudder and ailerons are controlled by a vertical handle so connected that forward or backward motion makes the plane go down or up, respectively, and sidewise motion makes the plane bank in the corresponding direction (R. 23).

What the Circuit Court of Appeals said about the "Corsair" in the *Chance Vought* case, is equally apt here, to summarize the evidence:

> The controls are usually operated [by the pilot] when it is desired to *overcome* the automatic stability of the plane, in order to execute some movement such as taking off,

> landing, or making a bank. (66 F. (2d) at p. 479, 1st column.)

That is similar to the finding of the court below, here, that the controls are operated "sometimes to assist and at other times to oppose" the inherent stability of the plane (R. 16).

In the accused planes there is no connection between the operation of the vertical and horizontal rudders. They are entirely independent and are independently connected and operated by entirely different controls. The vertical rudder is operated by the pilot's feet and the horizontal rudder by his hands. There is no interconnection or inter-relation, and nowhere is there any finding that there is any inter-relation or "cross-response", except of a minor character, between the vertical and horizontal rudders or controls in any of the accused airplanes.

This is all in striking contrast with the patent in suit. In all three of *its* embodiments, the vertical and horizontal steering surfaces are integral and necessarily move together, as a unit. In two of the three embodiments ("bird tail" and "tandem-wing" monoplane; Binder pp. 7, 8) there is *no* vertical rudder at all; both horizontal and vertical steering are accomplished by movement of one and the same horizontal surface—the horizontal tail of the "bird tail" and the rear wing of the "tandem-wing" monoplane. "This is the way the birds and particularly the seagulls use their tails

when they desire to turn" (patent in suit, p. 3, lines 49–51; Binder, p. 3). In the other embodiment of the patent in suit ("ring tail"; Binder, p. 12), there are vertical and horizontal surfaces, but they are all integrally mounted on the eccentrically hung "ring", so that any movement imparted to the ring, for the purpose of utilizing the function of the one, necessarily changes the position and "attitude" of the other. Figures 4, 5, and 19 of the patent (Binder, pp. 5, 12) show the eccentric hanging of the ring itself, and figures 5 and 6 (Binder, pp. 5, 7) show, in addition, the eccentric connection of the control rod, at the point marked 70.

Thus (see figures 6 and 10; Binder, p. 7), the only steering and pitching controls shown in the patent (handles 61 and 68, Fig. 6, and handles 86 and 80, Fig. 10) not only actuate the same integral control surfaces, but are both interdependently connected thereto; while in the "tandem wing" the control of the rear wing is by the "interdependent horizontal sticks" of the respondent's 1906 French patent. As the Circuit Court of Appeals tersely stated the matter:

> Of the three embodiments of the invention disclosed in the patent, the ring tail steers left or right by forward or backward motion of the steering lever; the bird tail steers left or right sometimes in response to the corresponding and sometimes in response to the opposite motion of the steering

> lever, depending upon the position of the joy-stick; and the tandem wing is controlled for pitch, roll, and steering by the two interdependent horizontal sticks constituting the "inherently defective" system of the 1906 French patent. (66 F. (2d) at p. 477, 1st col.)

We think the findings fully establish, therefore, that the petitioner's accused constructions are not only fundamentally different from, but substantially the opposite of, the disclosure of the patent in suit, as regards stability, equilibrium, and control. The point was summarized by the Circuit Court of Appeals, and we think the findings here establish the same facts:

> The patent has levers to produce stability; appellee has handles to produce instability by destabilizing the machine for an evolution. The patent has hand-produced stability or equilibrium, laterally, longitudinally, and directionally; appellee has automatic stability, laterally, longitudinally, and directionally. The patent has continuous hand lever manipulation for producing stability at all times; appellee has automatic stability at all times, occasionally using the controls for accentuating the automatic stability characteristics. (66 F. (2d) 479, second col.)

There is lacking, therefore, the essential identity of means, operation, and result, all of which must

concur to establish infringement, entirely irrespective of the language of the claims:

> The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent. "An infringement", says Mr. Justice Grier, in *Burr* v. *Duryee,* v *Wall.* 531, 572 [17: 650, 658], "involves substantial identity, whether that identity be described by the terms, 'same principle', same '*modus operandi*', or any other * * *". (*Westinghouse* v. *Boyden,* 170 U. S. 537 at p. 568.)[29]

Of the three accused constructions, two are *biplanes.* The patent in suit states at the outset that it has for its object "a *monoplan aeroplane",* with one or several pairs of wings which may be directed or distorted as desired (*supra,* p. 50)). All three of the alternative "embodiments" of the patent are monoplanes, and, until just before grant of

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[29] See also *Holland Furniture Co.* v. *Perkins Glue Co.,* 277 U. S. 245, at p. 257, middle; *Cimiotti* v. *American Fur Refining Co.,* 198 U. S. 399 at p. 414; *Kokomo Fence Machine Co.* v. *Kitselman,* 189 U. S. 8 at p. 24. Compare also with reference to the analogy to violation of the letter of a statute without contravention of its spirit: *United States* v. *Kirby,* 7 Wall. 482 at pp. 486, bottom, 487.

the patent, the application was entitled, from the beginning, "System of *Monoplan* Aeroplane" (*supra,* p. 50). The grant of the patent in suit over the prior Wright patent was secured only by the respondent's representation to the Patent Office that there was an important distinction "between applicant's *monoplane* and the Wright *biplane.*" (Italics added.) (Binder, p. 79.) The Navy "Corsair", which the Circuit Court of Appeals considered and held not to infringe, was a *biplane,* and the court emphasized that distinction from the *monoplane* of the patent (66 F. (2d) at p. 479, middle of 1st column).

So, at least two of the three accused constructions are outside the patent in suit, in any event, on the fundamental representation which the patentee made to the Patent Office, concerning the scope of his invention and its alleged distinction from the prior art, in order to induce the grant of the patent, and on the basis of which the Patent Office finally made the grant.

The fact is, however, that even in language, the claims in suit are expressly limited so as to *exclude* all of the petitioner's accused constructions.

The claims in suit are numbers 2 and 5 to 9, inclusive. They do not find even verbal response in any of the alleged infringing machines; much less are they satisfied in substance:

Claim 2 calls for an aeroplane having "distortable wings", not used by the petitioner, for peti-

tioner has ailerons (as in the prior art) for executing maneuvers, instead of distortable wings (like the respondent's disclosure and the Wright plane). The claim specifies, next, that the distortable wings are "for *maintaining* transverse stability", and requires a (horizontal) rudder "for *maintaining* longitudinal stability." Neither requirement is found in the petitioner's machines, since, in them, both transverse and longitudinal stability are *inherent*. They do not require to be "*maintained*" by distortion of the wings or by operation of a horizontal rudder. The claim also requires a lever for "*controlling*" the (distortable) wings and the (horizontal) rudder. Petitioner's wings are rigid, and the ailerons and rudder are always in a normal position if the controls are not used. And finally, the claim requires a steering rudder and "a *separate* lever" for controlling the steering (vertical) rudder. If the claim is applicable to petitioner's vertical lever (which operates the ailerons and elevator), and cross-wise foot bar (which operates the vertical rudder), it is not supported by the disclosure of the patent, for in the patent the two levers 61, 68 (Fig. 6; Binder, p. 7), 86, 80 (Fig. 10; Binder, p. 7), are not "*separate.*" Not only are they mechanically inter-connected; they interact *operatively* so that pitch and steering can not be "separately" controlled.

Claims 5 to 9, inclusive, each specify the combination of "means for *producing* lateral stability", "means for *producing* longitudinal stability" (sig-

nifying the distortable wings and movable tail) and "a single vertical lever", "movable" (claims 5–8) or "oscillatable" (claim 9), "in every direction", "for *operating* both said means."

On their face, therefore, those claims find no response in the petitioner's machines, because in all of the petitioner's machines both the "means for *producing* lateral stability" and "means for *producing* longitudinal stability" are built into the planes and are incapable of operation by "a single vertical lever" or in any other way. They are not under the control of the pilot at all, hence incapable of *any* "operation." The means for "*producing*" lateral and longitudinal stability—the dihedral angle, the horizontal fin at the tail, the sweepback, and the vertical fin—are permanently fixed and cannot be operated by any "means."

Hence even the language of the claims in suit expressly excludes the petitioner's airplanes. If the terms of the claims be properly related to the disclosure of the patent, they are in contrast to petitioner's constructions. Petitioner has no means for "maintaining" or "producing" stability capable of operation by "a single vertical lever" or otherwise.

But whatever the language in which the claims are expressed, they can not, in any event, be broader than the invention, and hence are not infringed. If they apply to the machines shown in the patent (all three of which are unstable),

wherein stability has to be "maintained" or "produced" by lever-movements, petitioner's machines do not infringe because they are not of that sort.

The claims of the patent in suit can not, in any event, if valid at all, be construed to cover the petitioner's machines. The latter follow and utilize the features of the prior art and are justified thereby; hence the claims of the patent, if valid, can not reach the petitioner.

The Penaud and Gauchot French patent, long prior to the respondent, showed and described all the structural elements utilized in the petitioner's machines for giving inherent, automatic stability, the dihedral angle, fixed vertical and horizontal fins at the tail, and sweep-back. Sheet 3 of the Penaud and Gauchot patent (Binder, p. 166) shows the dihedral angle; sheet 2 (Binder, p. 165) the sweep-back and the fixed horizontal fin at the rear (cross-hatched); and sheet 1 (Binder, p. 164) shows both the vertical and horizontal fixed fins at the rear. Thus, all of petitioner's automatically stabilizing elements are present, in the same combination, in this early French patent, long antedating the respondent.

The movable control surfaces utilized by petitioner for executing maneuvers are all also old in the prior art. The same Penaud and Gauchot patent has independent vertical and horizontal rudders associated with the respective fixed fins. The vertical rudder is GV (sheet 1, Binder, p. 164), and the two movable horizontal rudders are GH, GH

(sheet 2, Binder, p. 165). Like the petitioner's, they are entirely independent and may be operated separately, although in Penaud and Gauchot the two rudders are actuated by different motions of a single vertical control lever. The same patent also describes ailerons, without showing them in the drawings. They are, however, both shown and described in Laroze. The latter has, also, a movable vertical rudder for steering. The Wrights also had it, as well as a movable horizontal rudder or "elevator" for up and down steering, and also wing warping—the equivalent of ailerons. Hence all of petitioner's movable control surfaces were old, long before respondent, in the same combination, for producing the same results.

That leaves to the respondent only the use of a single vertical handle for operating two of the three well-known movable control surfaces. But this the patent in suit shows and describes for *"maintaining"* or *"producing"* stability. Petitioner has a vertical lever for operating two of its controls, but not to "produce" or "maintain" stability—for stability is inherent in petitioner's machines. Petitioner's lever is for use by the pilot to execute maneuvers when desired, and, in doing so he may either *assist* or *oppose* the inherent stability of the machines, as the court below found (R. 16, end of Finding XI). And, in any event, such vertical control levers or handles for operating the movable control surfaces of airplanes are also old, as in Laroze, Penaud and Gauchot, Bleriot, and the

other prior art already described (*supra*, pp. 26–33). Nor is it any more than a vertical mounting of the horizontal handle, also old, for the same purpose, and dedicated to the public in this country by respondent's failure to apply, within a year, for a United States patent corresponding to his first French patent. Even petitioner's control handle is, therefore, likewise old in the prior art, and petitioner utilizes nothing which is new in the patent in suit.

Thus, petitioner is shown to follow the prior art and to be wholly justified thereby. Its machines utilize no novel feature or element of the patent in suit:

> Assuming the validity of the patent in suit, it must be limited to the structure disclosed employing the *bird tail* or *ring tail* unit for control about the longitudinal and vertical axes with a restricted range of equivalents. (*Pelterie* v. *Chance Vought*, 66 F. (2d) at p. 478, second column.)

Petitioner does not utilize either the bird tail or the ring tail of the patent in suit, nor any equivalent thereof, and hence does not infringe. If valid, the claims of the patent in suit can not cover the petitioner, because the petitioner's structure is like the prior art.

In concluding this part of the discussion, it seems important to call attention to the fact that the Circuit Court of Appeals held that modern airplanes do not infringe the respondent's patent. The

three airplanes to which the findings of the court below in this case are directed are not as modern as those involved in the case decided by the Circuit Court of Appeals. They were wartime airplanes and represented a transition stage in aircraft construction. Consequently, under no circumstances, should the petitioner be precluded from showing that the modern airplanes which it has purchased and used subsequently to the war do not come within the scope of the patent. This, of course, is a matter that may be left to the accounting proceeding with suitable directions from this Court, should the case reach that stage. We contend, however, as heretofore shown, that the patent is invalid, so that the question as to what, if any, airplane infringed becomes immaterial.

CONCLUSION

The judgment of the Court of Claims should be reversed and the petition dismissed.

Respectfully submitted.

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APPENDIX

R. S., Section 4886 (U. S. C., Title 35, Sec. 31):

> Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, or who has invented or discovered and asexually reproduced any distinct and new variety of plant, other than a tuber-propagated plant, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law and other due proceeding had, obtain a patent therefor.

R. S., Section 4887 (U. S. C., Title 35, Sec. 32):

> No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless the application for said foreign patent was filed more than twelve months, in cases within the provisions of section 31 of this title, and four months in cases of designs, prior to the

filing of the application in this country, in which case no patent shall be granted in this country.

An application for patent for an invention or discovery or for a design filed in this country by any person who has previously regularly filed an application for a patent for the same invention, discovery, or design in a foreign country which, by treaty, convention, or law, affords similar privileges to citizens of the United States shall have the same force and effect as the same application would have if filed in this country on the date on which the application for patent for the same invention, discovery, or design was first filed in such foreign country, provided the application in this country is filed within twelve months in cases within the provisions of section 31 of this title, and within four months in cases of designs, from the earliest date on which any such foreign application was filed. But no patent shall be granted on an application for patent for an invention or discovery or a design which had been patented or described in a printed publication in this or any foreign country more than two years before the date of the actual filing of the application in this country, or which had been in public use or on sale in this country for more than two years prior to such filing.

R. S., Section 4923 (U. S. C., Title 35, Sec. 72):

Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discov-

ery, or any part thereof, having been known or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication.

Act of June 25, 1910, as amended by Act of July 1, 1918 (U. S. C., Title 35, Sec. 68):

Whenever an invention described in and covered by a patent of the United States shall be used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, such owner's remedy shall be by suit against the United States in the Court of Claims for the recovery of his reasonable and entire compensation for such use and manufacture. The Court of Claims shall not entertain a suit or award compensation under the provisions of this section where the claim for compensation is based on the use or manufacture by or for the United States of any article owned, leased, used by, or in the possession of the United States prior to June 25, 1910. In any such suit the United States may avail itself of any and all defenses, general or special, that might be pleaded by a defendant in an action for infringement, as set forth in this chapter, or otherwise. The benefits of the provisions of this section shall not inure to any patentee who, when he makes such claim, is in the employment or service of the Government of the United States, or the assignee of any such patentee. This section shall not apply to any device discovered or invented by such employee during the time of his employment or service.

Judicial Code, Section 155 (U. S. C., Title 28, Sec. 261):

> Aliens who are citizens or subjects of any Government which accords to citizens of the United States the right to prosecute claims against such Government in its courts, shall have the privilege of prosecuting claims against the United States in the Court of Claims, whereof such court, by reason of their subject matter and character, might take jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE: 1939

APPENDIX B

Sheet 1:

Figure 1 of drawings of Wright Patent. (See Binder of Exhibits, p. 33.)

Sheet 2:

Drawings of respondent's 1906 French Patent (No. 372753). (See Binder of Exhibits, p. 195.)

Sheets 3 and 4:

Graphic representation of changes in the drawings of the patent in suit during the prosecution of application. (See Binder, pp. 43–130.)

Sheet 5:

Drawings of patent in suit:

(a) Figure 6: Diagram of ringtail embodiment. (See Binder of Exhibits, p. 7.)

(b) Figure 10: Diagram of bird tail embodiment. (See Binder of Exhibits, p. 7.)

(c) Figure 7a: Diagram showing bird tail embodiment, the controls of which operate in a contra-instinctive manner. (See Binder, p. 9.)

96019—36

U. S. GOVERNMENT PRINTING OFFICE: 1936

No. 821,393 PATENTED MAY 22, 1906.

O. & W. WRIGHT.

FLYING MACHINE.

APPLICATION FILED MAR. 23, 1903.

3 SHEETS—SHEET 1.

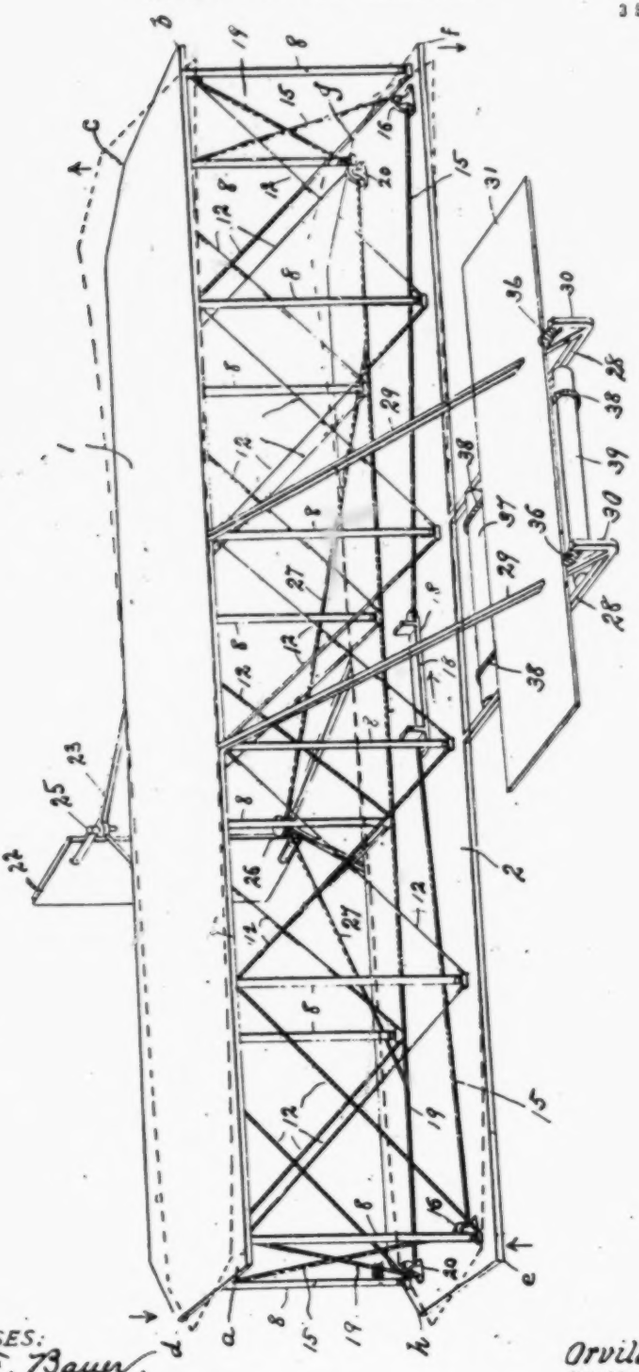


FIG. 1.

WITNESSES:
William F. Bauer.
Irvine Miller.

INVENTORS.
Orville Wright.
Wilbur Wright.
BY
H. A. Toulmin.
ATTORNEY.

N° 372.753

M. Esnault-Pelterie

PL unique

Fig.1

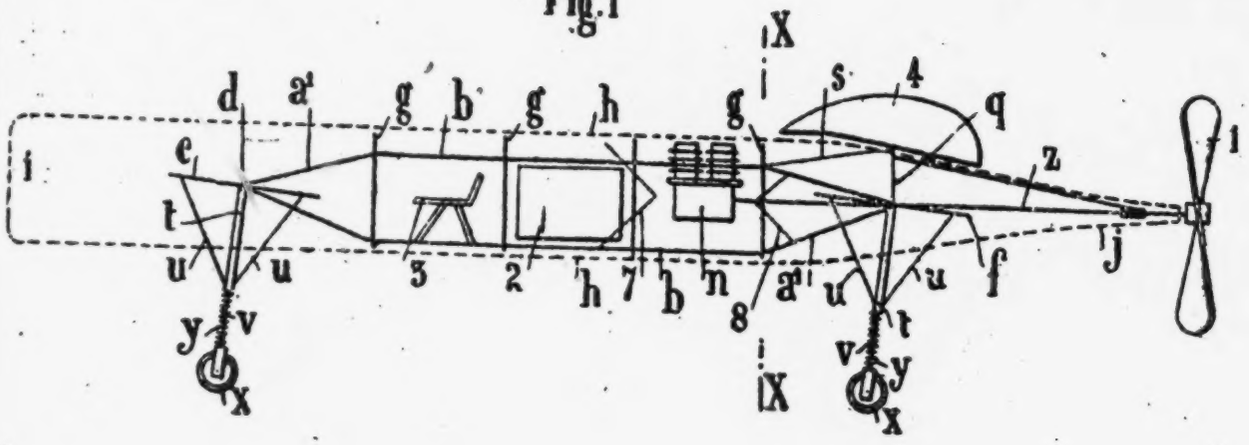


Fig.3

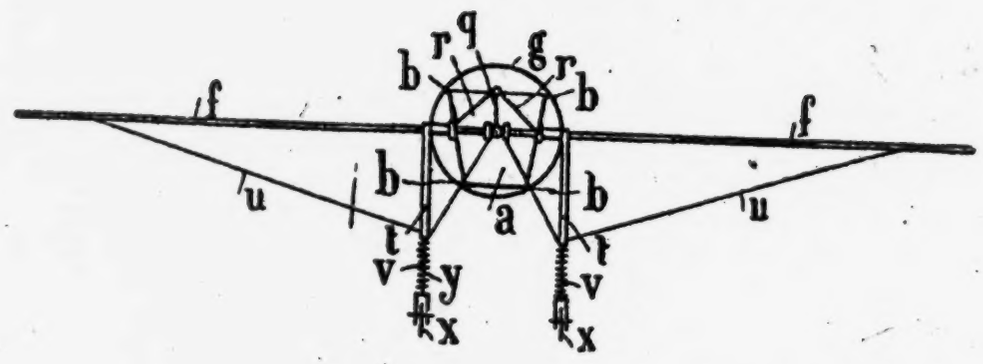


Fig.2

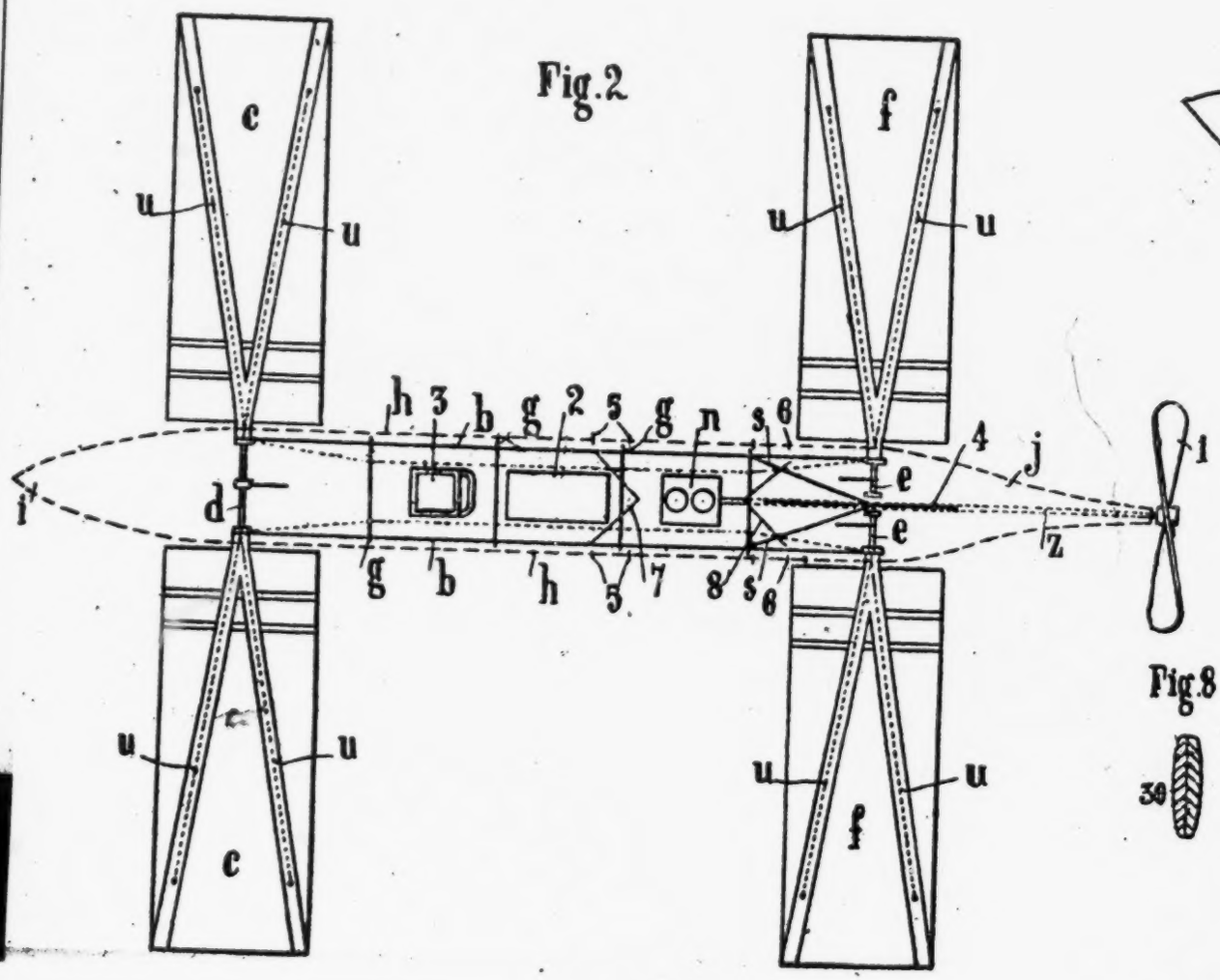


Fig.8

Fig.4

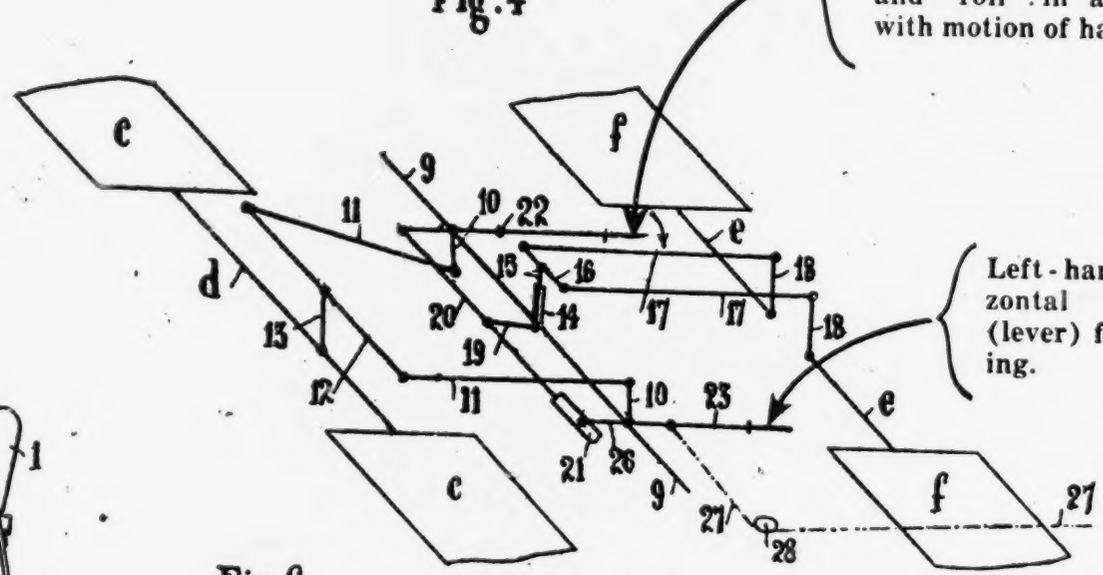


Fig.6

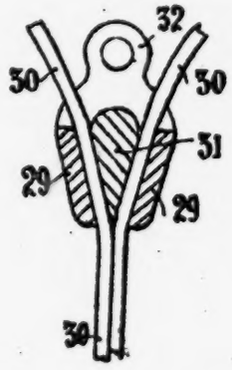


Fig.7

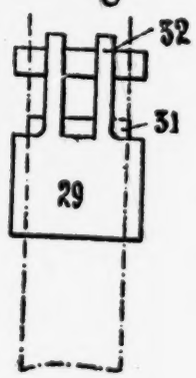
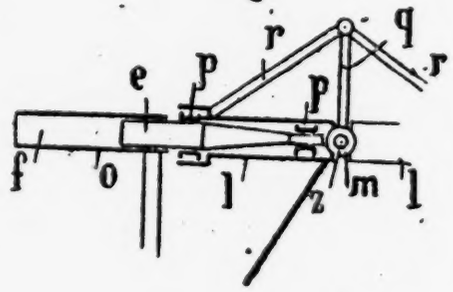


Fig.5



Original Drawings, Sheet 1

Cancelled Feb. 2, 1909.

Fig. 1.

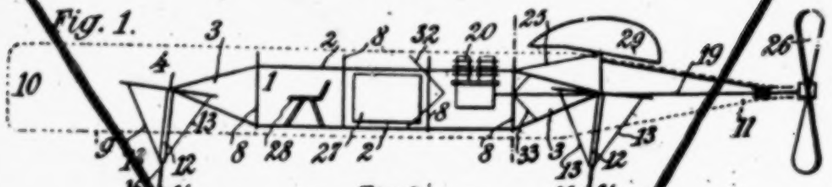


Fig. 3.

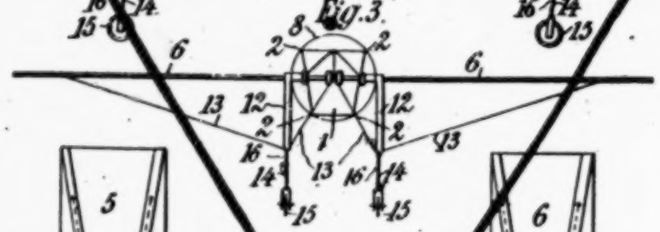


Fig. 2.

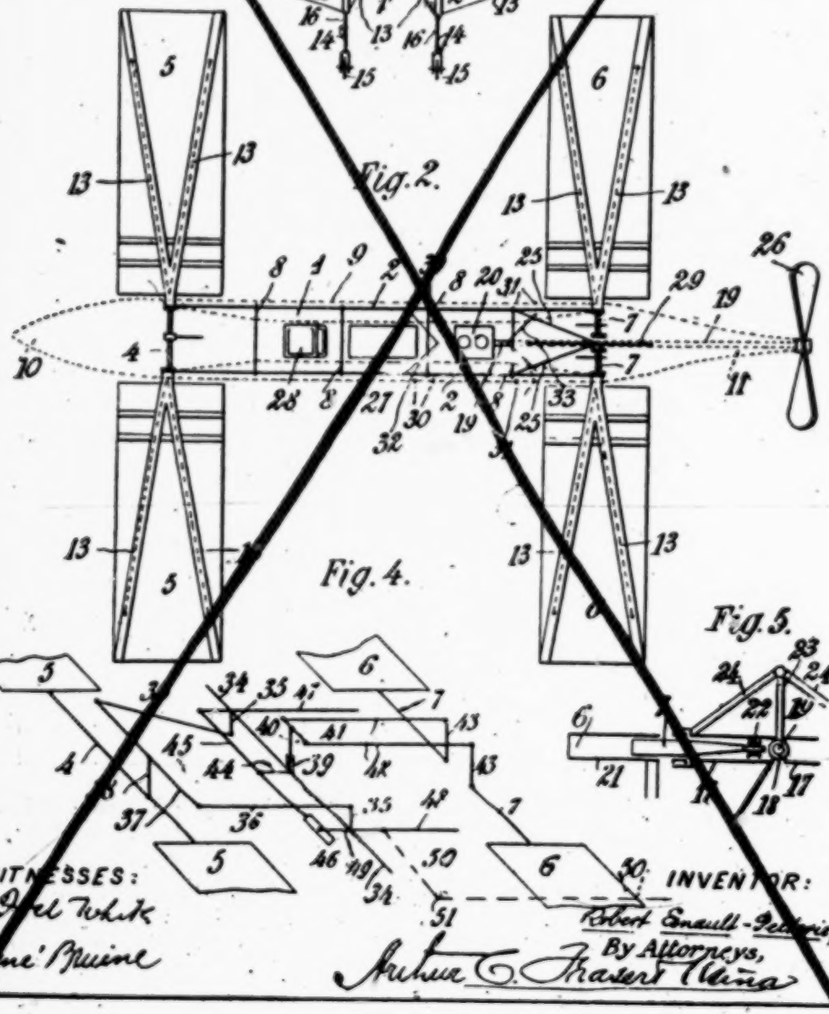


Fig. 4.

Fig. 5.

WITNESSES:
Fred White
René Bruine

INVENTOR:
Robert Esnault-Pelterie,
By Attorneys,
Arthur C. Fraser & Co.

Original Drawings, Sheet 2

Figures renumbered Feb. 2, 1909.

Fig. 6.1

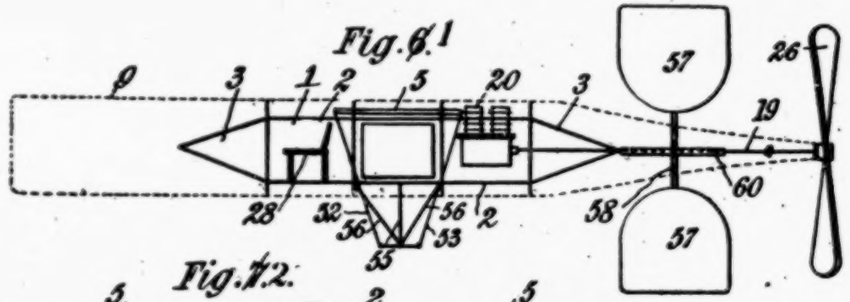


Fig. 12.

Fig. 16.

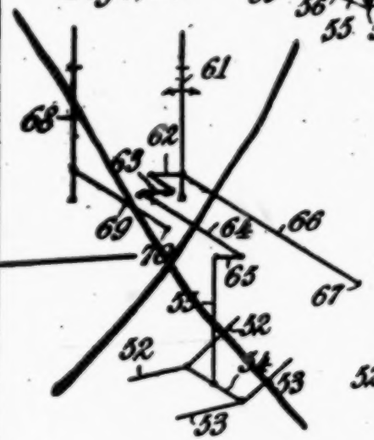


Fig. 14.

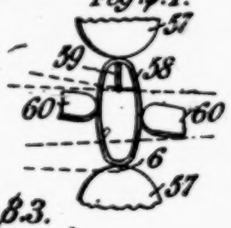


Fig. 15.

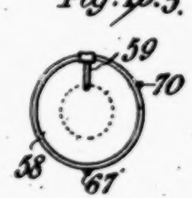
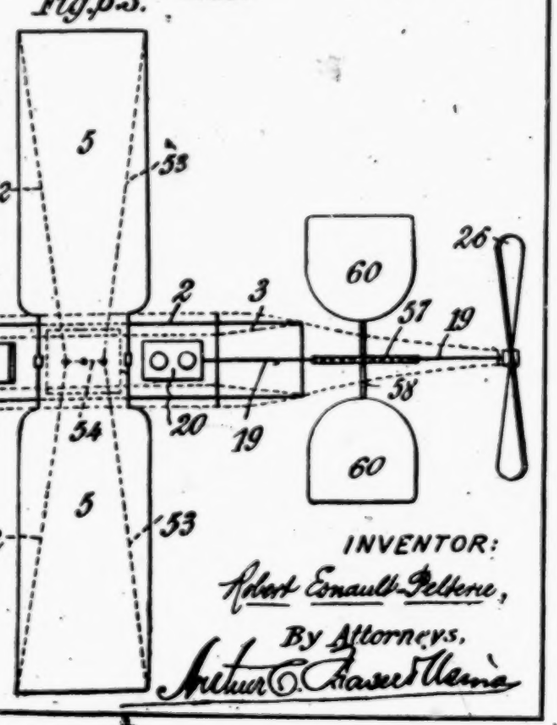


Fig. 13.



WITNESSES:
Fred White
René Bruine

INVENTOR:
Robert Esnault-Pelterie,
By Attorneys,
Arthur C. Fraser & Co.

Original Fig. 11 (later numbered Fig. 6) ordered erased, and substitute figure ordered to be made, May 9, 1911.

Sketches for substitute figure filed May 23, 1912.

New sheet of drawing (sheet 3 of patent) containing substitute Fig. 6 received by Patent Office June 29, 1912.

Original Drawings, Sheet 3

Figures renumbered Feb. 2, 1909.

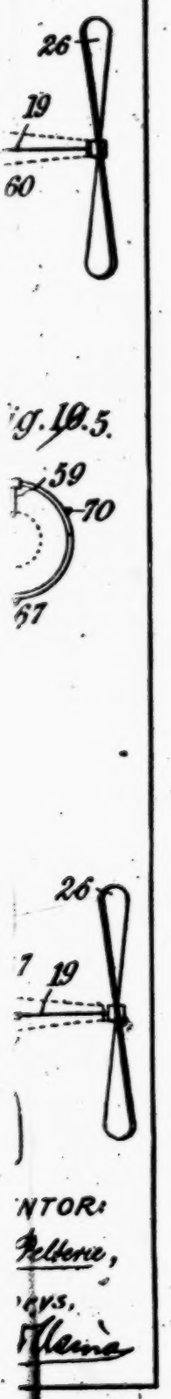


Fig. 6

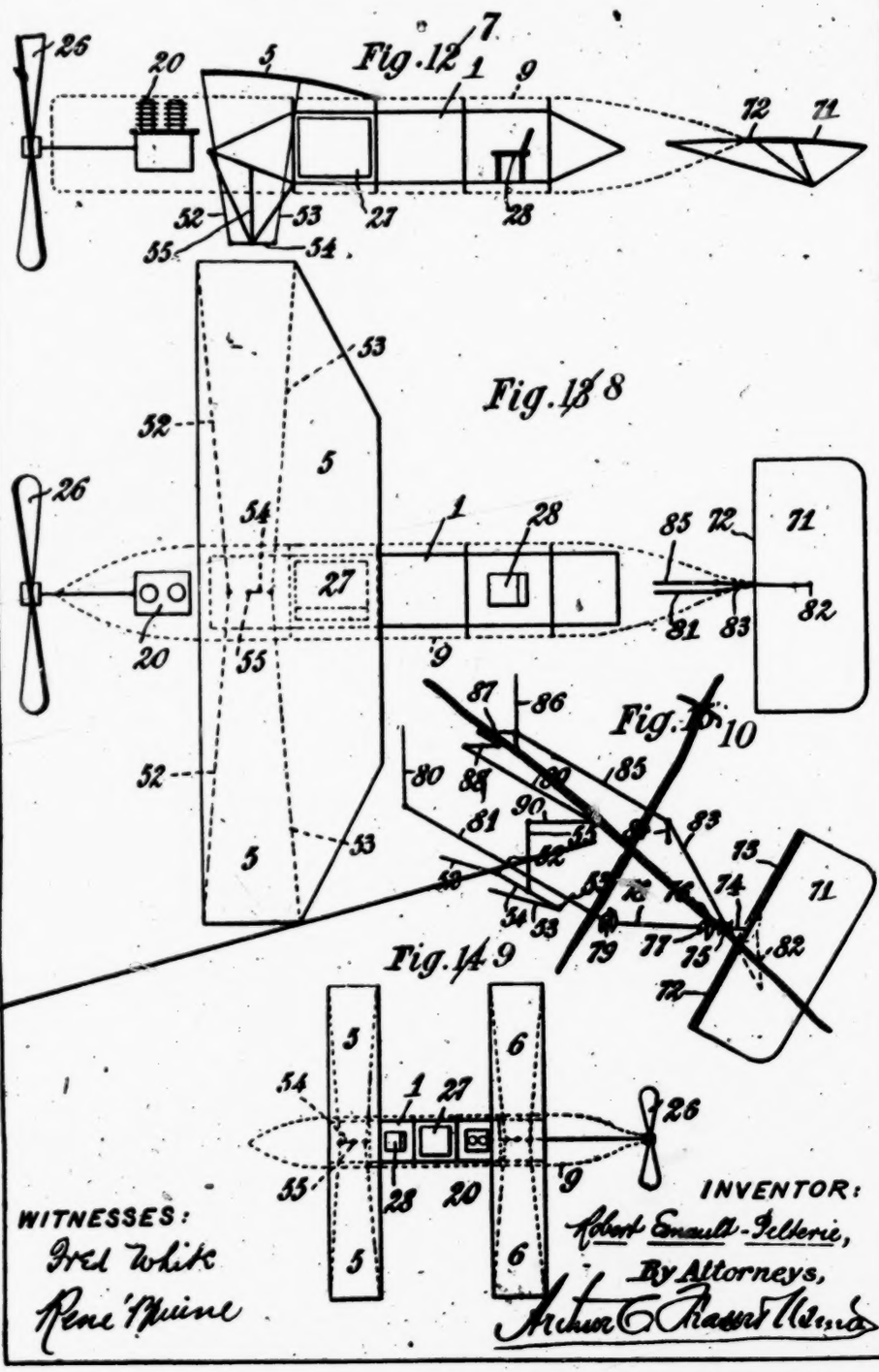


Fig. 12

Fig. 8

Fig. 10

Fig. 9

WITNESSES:
Fred White
Rene' Muine

INVENTOR:
Robert Ernault-Pelterie,
By Attorneys,
Arthur G. Fraser & Wms

Original Fig. 15 (later numbered Fig. 10) ordered erased, and substitute figure ordered to be made, May 9, 1911.

Sketches for substitute figure filed May 23, 1912.

New sheet of drawing (sheet 3 of patent) containing substitute Fig. 10 received by Patent Office June 29, 1912.

Original Drawings, Sheet 4

Figures renumbered Feb. 2, 1909.

Fig. 16. 11.

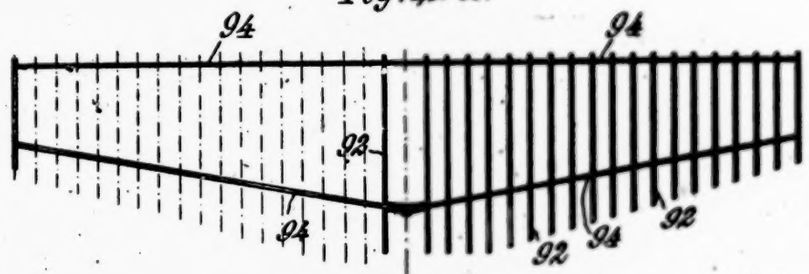
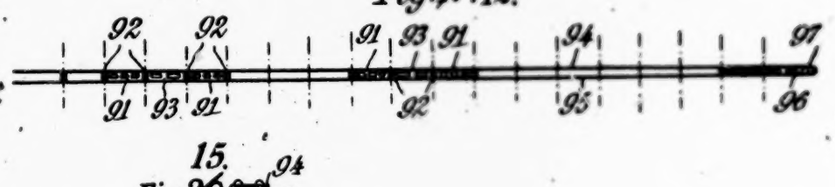


Fig. 17. 12.



15.

Fig. 20

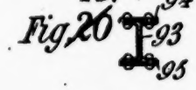


Fig. 18. 13.

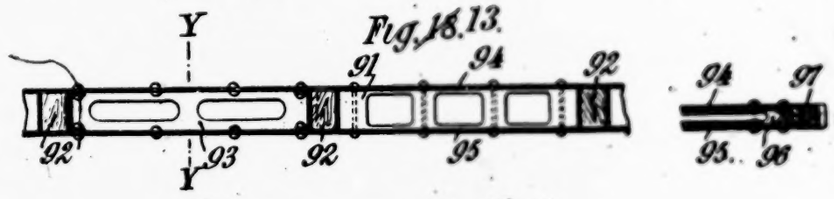
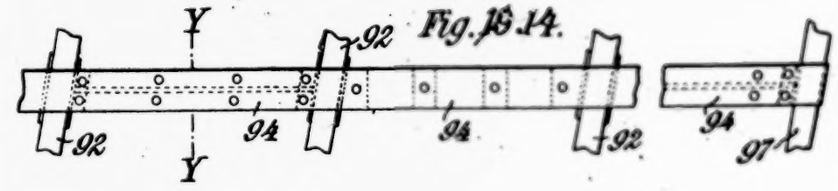


Fig. 19. 14.



WITNESSES:
Fred White
Rene' Muine

INVENTOR:
Robert Ernault-Pelterie,
By Attorneys,
Arthur G. Fraser & Wms

Patent in Suit.

R. ESNAULT-PELTERIE.

AEROPLANE.

APPLICATION FILED JAN. 16, 1908.

1,115,795.

Patented Nov. 3, 1914.

3 SHEETS—SHEET 2.

Fig. 3a

Not in Original Application.
Added Feb. 2, 1909.

Not Covered by Oath

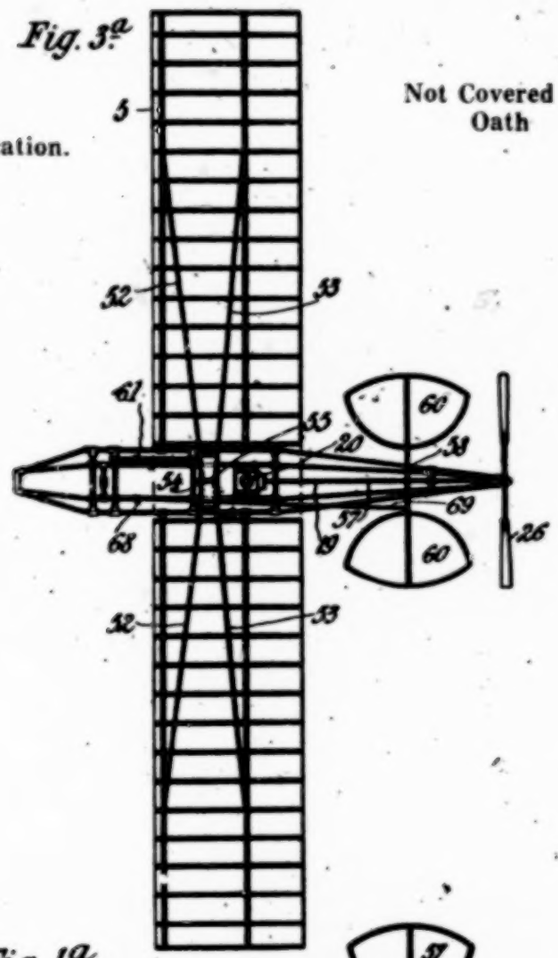
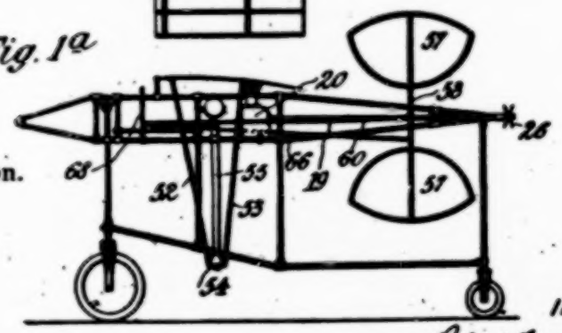


Fig. 1a



Not in Original Application.
Added Feb. 2, 1909.

Not Covered by Oath

WITNESSES.

Fred White

René Breuine

INVENTOR:

Robert Esnault-Pelterie,

By Attorneys,

Arthur Peaslee Mears

Patent in Suit.

R. ESNAULT-PELTERIE.

AEROPLANE.

APPLICATION FILED JAN. 16, 1908.

1,115,795.

Patented Nov. 3, 1914.

3 SHEETS—SHEET 3.

Not in Original Application.
Added June 29, 1912.

Not Covered by Oath

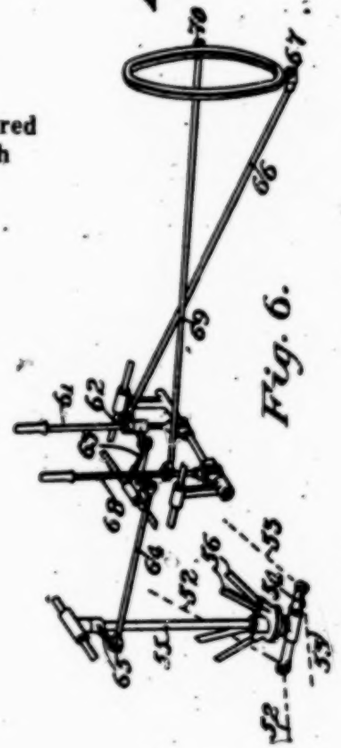


Fig. 6.

Not Covered by Oath

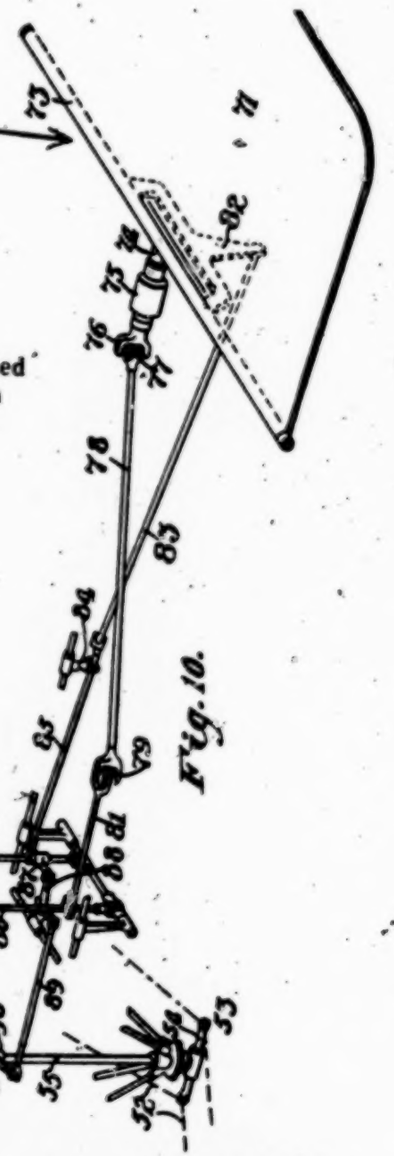


Fig. 10.

Witnesses.

Fred White

René Breuine

Inventor:

Robert Esnault-Pelterie,

By Attorneys

Fraser Turk Hughes

Patented Nov. 3, 1914.
6 SHEETS—SHEET 3.

R. ESNAULT-PELTERIE.
AEROPLANE.
APPLICATION FILED JAN. 16, 1908.

1,115,795.

Patented Nov. 3, 1914.
6 SHEETS—SHEET 5.

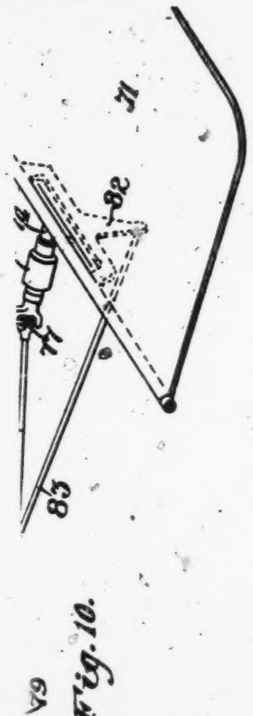


Fig. 10.

Inventor:
nault-Pelterie,
Clark Hughes

Not Covered by Oath

Not in Original Application Added Feb. 2, 1909.

Fig. 8a

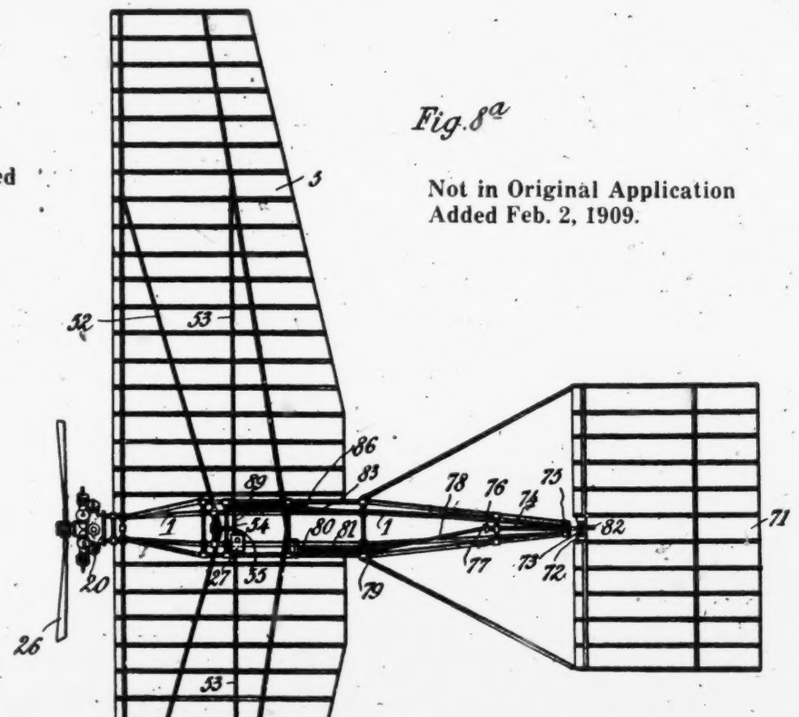
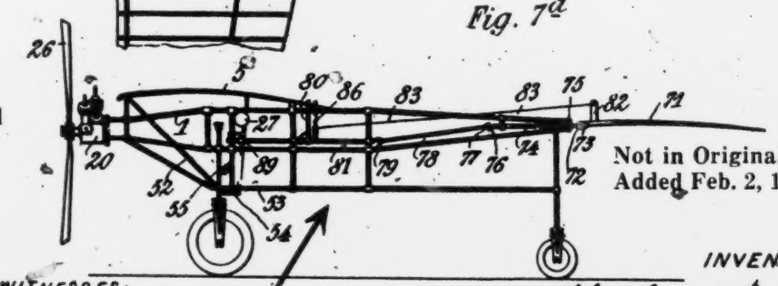


Fig. 7a



Not Covered by Oath

Not in Original Application Added Feb. 2, 1909.

WITNESSES:
Fred White
René Pluine

INVENTOR:
Robert Esnault-Pelterie,
By Attorneys,
Arthur O. Fraser & Olsen

Fig. 7a shows a construction which is inconsistent with the asserted invention.

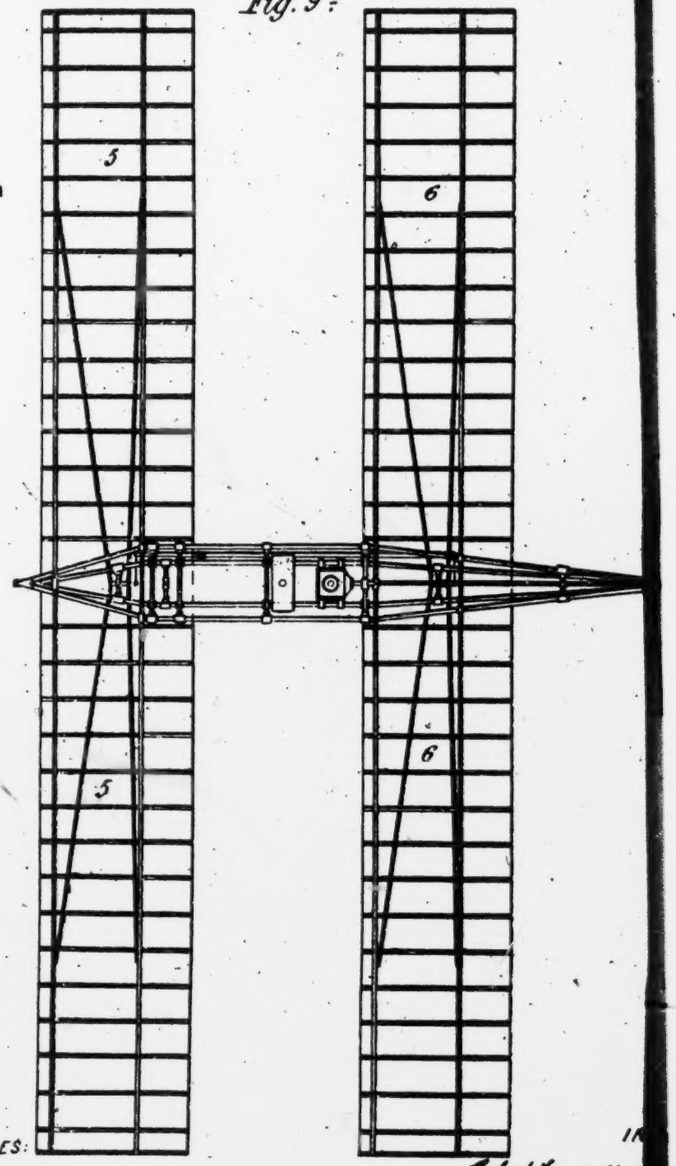
It was inserted in response to the requirement of the Patent Office for a detailed showing of the mechanism.

R. ESNAULT-PELTERIE.
AEROPLANE.
APPLICATION FILED JAN. 16, 1908.

1,115,795.

Patented N
6 SHEET

Fig. 9a



Not in Original Application Added Feb. 2, 1909.

Not Covered by Oath

WITNESSES:
Fred White
René Pluine

Robert Esnault-
By A
Arthur O. Fraser & Olsen

FILE WRAPPER OF

UNITED STATES PATENT IN SU

Patent in Suit.

R. ESNAULT-PELTERIE.

AEROPLANE.

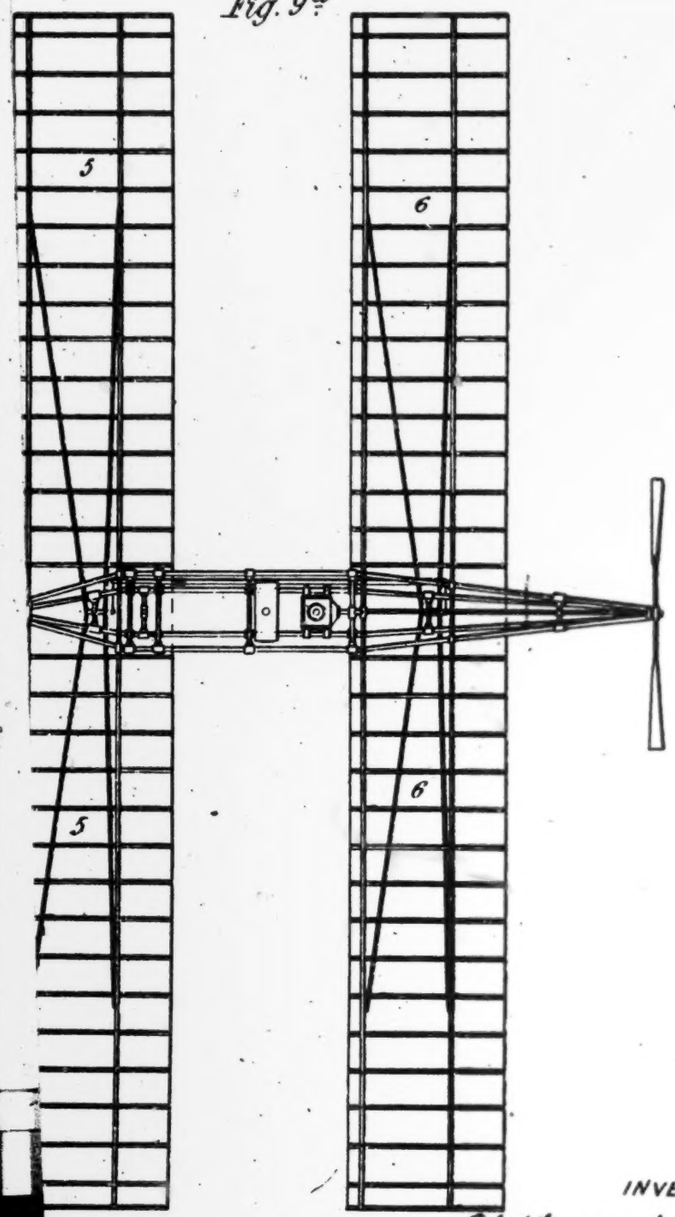
APPLICATION FILED JAN. 16, 1908.

795.

Patented Nov. 3, 1914.

8 SHEETS—SHEET 8.

Fig. 9a



INVENTOR:

Robert Esnault-Pelterie,

By Attorneys.

Arthur & Fraser & Ussma

Patent in Suit.

R. ESNAULT-PELTERIE.

AEROPLANE.

APPLICATION FILED JAN 16, 1908.

1,115,795.

Patented Nov. 3, 1914.

8 SHEETS—SHEET 8.

Not in Original Application.
Added March 1, 1910.

Fig. 16.

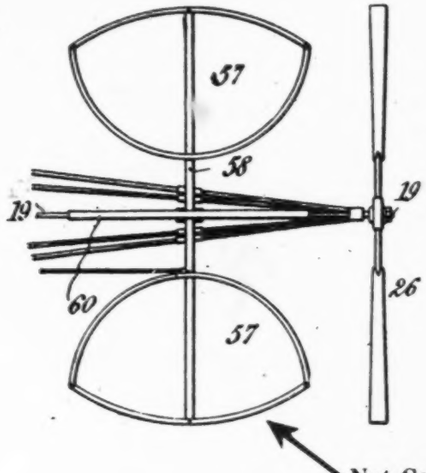
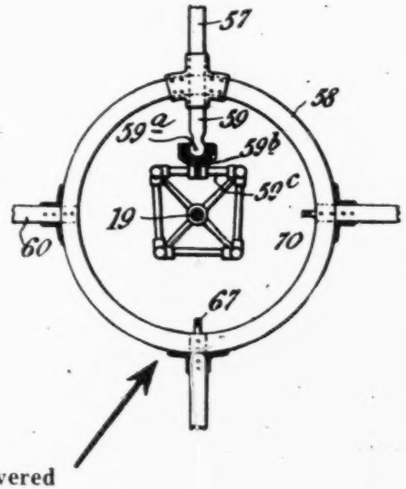


Fig. 19.



Not Covered by Oath

Fig. 17.

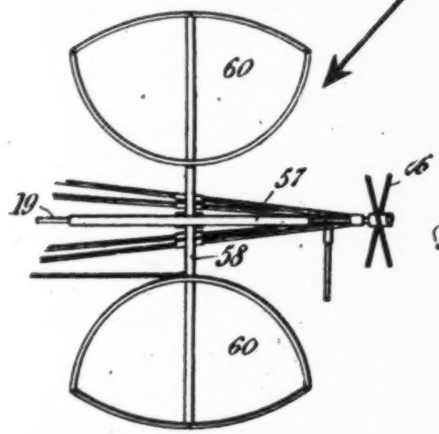
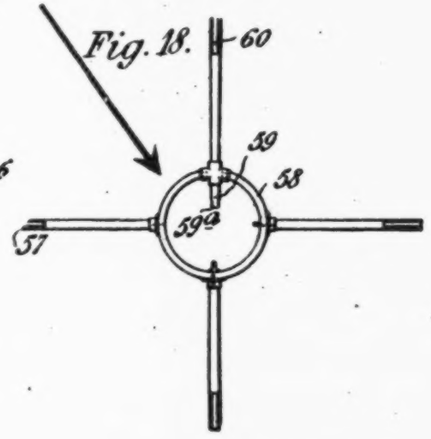


Fig. 18.



WITNESSES:

Fred White

René Pluine

INVENTOR:

Robert Esnault-Pelterie.

By Attorneys,

Arthur & Fraser & Ussma

1,115,795.

R. ESNAULT-PELTERIE.

AEROPLANE.

APPLICATION FILED JAN. 16, 1908.

Patented Nov. 3, 1914.

8 SHEETS—SHEET 3.

Fig. 6.

Fig. 10.

Fig. 7a

INVENTOR:

Robert Esnault-Pelterie,

By Attorneys,

Arthur O. Bassett Alexander

WITNESSES:

Fred White

René Pruine

INDEX.

	PAGE
Statement	1
Substance of the Question Involved in This Petition	2
Short Statement of Reasons Why the Petition Should Be Denied	2
Point 1.—Findings of Fact of the Court of Claims Are Not Subject to Review	3
Point 2.—The Validity of a Patent in View of the Prior Art Is a Question of Fact	4
Point 3.—The Question of Infringement of a Patent Is a Question of Fact	7
Point 4.—The Question of Law, Presented in the Petition as Question 4, Is Fictitious	7
Point 5.—The Question of Law, Presented in the Petition as Question 5, Is Also Fictitious	9
Point 6.—The Question of Law, Presented in the Petition as Question 7, Is Also Fictitious	10
Point 7.—This Case Involves Nothing but the Questions of Validity and Infringement	11
Reasons Alleged for Granting the Writ	12
Esnault-Pelterie v. Chance Vought Corporation (answering Petitioner's Reason 1)	12
This Case Is Not of "Momentous Importance Both to the Government and to the Entire Aircraft Industry" (answering Petitioner's Reason 2)	14
Grant of Petition upon Interlocutory Judgment (answering Petitioner's Reason 3)	15
Alleged Errors of the Court of Claims (answering Petitioner's Reason 4)	16
The Chance Vought Decision, Being on a Different Record, Has No Bearing on the Case at Bar	18
Meritorious Character of the Invention in Suit	20
The Decision of the Court of Claims	21
Conclusion	21

TABLE OF CASES CITED.

PAGE

Bischoff v. Wethered, 76 U. S. 812 ..... 4, 5, 6

Chapman v. Wintroath, 252 U. S. 216 8

Esnault-Pelterie v. Chance Vought Corp., 66 F. (2d) 474 ..... 1, 12, 14, 18, 19

Heald v. Rice, 104 U. S. 737 ..... 5, 6

Layne & Bowler Corp. v. Western Wells, 261 U. S. 388 .. 14

Luckenbach v. United States, 272 U. S. 533 ..... 3, 4

Market Street Cable Railway Co. v. Rowley, 155 U. S. 621 6

Overland Motor Co. v. Packard Motor Co., 274 U. S. 417 9

Royer v. Schulz Belting Co., 135 U. S. 319 ..... 5, 7

St. Joseph Stock Yards Co. v. United States, 80 Law. Ed. (Advance Opinions) No. 14, p. 679 4

Singer Mfg. Co. v. Cramer, 192 U. S. 275 6

Stilz v. United States, 269 U. S. 145 7

Webster v. Splitdorf Co., 264 U. S. 463 8

Williams v. United States, 289 U. S. 553 12

IN THE

Supreme Court of the United States

OCTOBER TERM, 1935.

UNITED STATES OF AMERICA, Petitioner, vs. ROBERT ESNAULT-PELTERIE, Respondent.	No. 963.

BRIEF FOR RESPONDENT IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI.

Statement.

The petition prays that a writ of certiorari issue to the Court of Claims of the United States directing that the above-entitled cause be submitted to this Court for review. The findings of fact, conclusions of law, opinion, and judgment of the Court of Claims have not yet been reported. They are before this Court in the transcript of record.

The petition is based on the grounds (1) that there is a conflict between the decision of the Court of Claims and that of the Circuit Court of Appeals for the Second Circuit in *Esnault-Pelterie* v. *Chance Vought Corporation,* 66 Fed. (2d) 474; (2) that the questions of validity and construction of the patent and its infringement are of momentous importance both to the Government and to the entire aircraft industry; (3) that a judgment (interlocutory) has been entered; and (4) that the decision of the Court of Claims is erroneous.

Substance of the Question Involved in This Petition.

Will this Court review a Court of Claims case, such as the case at bar, wherein the facts found must be taken as correct, and wherein there are no legitimate errors of law alleged by the petitioner? Or will this Court refuse such review unless shown that the Court of Claims erred in some point of law of general importance?

We submit the answer should be "No" to the first question, and "Yes" to the second.

Short Statement of Reasons Why the Petition Should Be Denied.

1. Under Section 288, Title 28, U. S. C., and the decisions of this Court, the Court of Claims is the final arbiter of the facts, and the power of review of this Honorable Court is limited to questions of law.

2. Under the decisions of this Court the questions as to whether a patent is valid and how it should be construed in view of the prior art are questions of fact.

3. Under this Court's decisions the question as to whether a patent is infringed is a question of fact.

4. The first question of law presented in the petition (Q. 4, p. 2) is clearly fictitious, being based upon misstatements of fact.

5. The second question of law presented in the petition (Q. 5, p. 2) is also fictitious, being based upon misstatements of fact.

6. The third and last question of law presented in the petition (Q. 7, p. 3) is fictitious because it asks this Court to alter by judicial construction the provisions of Section 4923, R. S., the substance of which has been present in our law for the last hundred years.

7. There is nothing of merit presented in this case except the plain questions as to whether or not the patent in suit is valid in view of the prior art and is infringed by defend-

ant's structures. Both of these questions are found in the affirmative by the Court of Claims.

We will now refer to these seven propositions under similar headings.

1.

Findings of Fact of the Court of Claims Are Not Subject to Review.

THE LAW. Section 288 (Title 28, U. S. C.), so far as relates to the question at hand, is as follows:

> "(b) In any case in the Court of Claims, including those begun under section 287, it shall be competent for the Supreme Court, upon the petition of either party, whether Government or claimant, to require, by certiorari, that the cause, including the findings of fact and the judgment or decree, but omitting the evidence, be certified to it for review and determination with the same power and authority, and with like effect, as if the cause had been brought there by appeal."

This statute was passed on February 13, 1925. Prior to that date the Supreme Court had appellate jurisdiction over judgments or decrees of the Court of Claims. The significant provision of the clause just quoted is that the evidence is omitted, the findings of fact only being certified to this Court, together with the judgment or decree.

THE DECISIONS OF THIS COURT. Recognizing these principles, this Court in *Luckenbach* v. *United States*, 272 U. S. 533, stated (p. 537):

> "Save in special cases not needing present mention, Congress never has provided for a general review by this court of cases coming from the Court of Claims. On the contrary—and probably because that court is composed of five judges, all usually hearing cases together and the concurrence of three being necessary to a decision in any case—Congress has pursued the policy of permitting only a limited review on questions of law: * * *."

Again, on page 538:

> "This court uniformly has regarded the legislation and rules as confining the review to questions of law *shown by the record when made up as the rules direct.* * * *" (Italics ours.)

Other decisions could be cited to the same effect. In passing over these, however, we would refer briefly to the latest decision of this Court on a similar point, dated April 27, 1936, in *St. Joseph Stock Yards Co.* v. *United States,* No. 497, October Term, 1935. In this decision, which is reported in Vol. 80, No. 14 of the Supreme Court Law Ed. Advance Opinions, page 679, the Court stated:

> "* * * When the legislature itself acts within the broad field of legislative discretion, its determinations are conclusive. When the legislature appoints an agent to act within that sphere of legislative authority, it may endow the agent with power to make findings of fact which are conclusive, provided the requirements of due process which are specially applicable to such an agency are met, as in according a fair hearing and acting upon evidence and not arbitrarily" (authorities cited—p. 685).

If this rule is correct with regard to commissions or special legislative bodies, it must be true with regard to a regularly constituted legislative court having a certain definite jurisdiction, such as the Court of Claims.

In the case at bar there is no allegation that the requirements of due process were not observed, or that there was no evidence to support any of the findings.

2.

The Validity of a Patent in View of the Prior Art Is a Question of Fact.

The leading case on this subject is *Bischoff* v. *Wethered,* 76 U. S. 812-816. In that case this Court said:

> "It is, undoubtedly, the common practice of the United States Circuit Courts, in actions at law, on questions of priority of invention, where a patent

> under consideration is attempted to be invalidated by a prior patent, to take the evidence of experts as to the nature of the various mechanisms or manufactures described in the different patents produced, and as to the identity or diversity between them; and to submit all the evidence to the jury under general instructions as to the rules by which they are to consider the evidence. * * *"

Later the Court considers the objection that it is the province of the Court and not the jury to construe the meaning of documentary evidence, but holds that specifications of patents for inventions are documents of a peculiar kind, describing, as they do, mechanisms completely outside of themselves, so that their identity is a question of fact for the jury. The Court then refers to the change in the rulings in England on the same question, the courts in that country having first held that it was the province and duty of the Court to compare the documents and to decide on the identity or diversity of the inventions; but having later adopted the United States rule. The Court further held:

> "* * * It is not the *construction* of the instrument, but the *character of the thing invented,* which is sought in questions of identity and diversity of inventions." (Italics the Court's.)

So far as we are able to ascertain, this decision has never been overruled or substantially modified.

In *Royer* v. *Schulz Belting Co.,* 135 U. S. 319, the Court held that it was a question for the jury to pass upon whether the patented invention was of primary character and the patent a "pioneer patent."

Doubtless there are questions of validity which are questions of law. See *Heald* v. *Rice,* 104 U. S. 737-757, in which there was a question of identity of the invention described in an original patent and its reissue. This was held to be a matter of law for the Court because it involved merely a comparison of patents on their faces. It is to be noted, however, that this Court held that the ruling was consistent with the ruling in *Bischoff* v. *Wethered, supra.*

We are not overlooking this Court's decision in *Market Street Cable Railway Co.* v. *Rowley,* 155 U. S. 621, or its decision in *Singer Mfg. Co.* v. *Cramer,* 192 U. S. 275 (25 Sup. Ct. 291, 295).

In the first of these cases this Court said, on page 625:

> "* * * No extrinsic evidence was given or needed to explain terms of art, or to apply the descriptions to the subject-matter, so that the court was able, from mere comparison, to say what was the invention described in each, and to affirm from such mere comparison whether the inventions were or were not the same. * * *"

In *Singer* v. *Cramer, supra,* page 443, this Court said:

> "* * * As in each of the patents in question it is apparent from the face of the instrument that extrinsic evidence is not needed to explain terms of art therein, or to apply the descriptions to the subject-matter, and as we are able, from mere comparison, to comprehend what are the inventions described in each patent, and, from such comparison, to determine whether or not the Diehl device is an infringement upon that of Cramer, the question of infringement or no infringement is one of law, * * *."

These cases related to two very simple inventions coming under the *Heald* v. *Rice* decision (*supra*), where a question of validity or infringement was a mere matter of comparison.

In the present case, while the Court has not the full record before it, it is very evident from the findings and opinion that the case at bar is a very complicated one, involving, among other things, the laws of aerodynamics, requiring much expert evidence to elucidate. The findings show that lengthy wind-tunnel tests were made by the petitioner; that actual flight tests of airplanes were made by the petitioner and respondent and that testimony was adduced relating to early practical work by the respondent involving the use of the invention.

In view of the foregoing circumstances it seems clear that the rule in *Bischoff* v. *Wethered, supra,* should control this case and not the exceptions in *Heald* v. *Rice.*

3.

The Question of Infringement of a Patent Is a Question of Fact.

The leading case on this subject is *Stilz* v. *United States*, 269 U. S. 145, in which the Court said, on page 147:

> "Infringement is a question of fact. The quoted finding is in the nature of a special verdict of a jury (cases cited). This court accepts the findings of fact made by the Court of Claims and can not review them (case cited). And even where a finding determines a mixed question of law and fact, it is conclusive unless the court is able to separate the question to see whether there is a mistake of law. * * *"

In *Royer* v. *Schulz Belting Co., supra,* the Court held that it was a question for the jury to pass upon whether the defendant's machine infringed the claims of plaintiff's patent.

4.

The Question of Law, Presented in the Petition as Question 4, Is Fictitious.

The point of law presented on page 2 of the petition as Question 4 (and argued in paragraph (d) on page 12 of the petition) involves the statement that the claims covering the single control lever here under consideration were not inserted in the application until June 12, 1913, notwithstanding the fact that the application was filed on January 16, 1908. The question also states that during the intervening period such control lever came into general use in the United States and was described in printed publications. The foregoing statements of fact are clearly erroneous, and it is upon this erroneous statement that the law point presented is dependent.

The true state of facts is found in Finding VIII (Rec. pp. 10-12), from which it is clear that the application as presented involved not only a disclosure of the invention, but claims substantially defining it, and also that on Febru-

ary 1, 1909, the respondent presented two other claims (Nos. 2 and 13), of which claim 2 is as follows:

> "2. An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder."

This claim, as found by the Court (Finding VIII), is of sufficient breadth to include the petitioner's airplanes here in suit. The Court of Claims refers to "the broad monopoly as expressed in claim 2" (Rec. p. 56). It was never erased after its insertion by the first amendment of the application on February 1, 1909, and forms claim 2 of the patent held by the Court to be infringed (compare Finding VIII and Finding IX). Hence, the fact is that there was no long delay such as is set up in Question 4.

Furthermore, there was no intervening use in the United States during the period from the filing of the application to the insertion of claim 2 on February 1, 1909. A few planes were made in the United States at some undisclosed time between 1910 and 1911 (Finding XXXVIII, Rec. p. 32), but this was after the introduction of claim 2 into the application.

Under the principles of *Chapman* v. *Wintroath*, 252 U. S. 216; *Webster* v. *Splitdorf Co.*, 264 U. S. 463, and similar decisions, this Court has specifically held that the intervening use must be during the period of absence from the application of the claims in question and that such absence was of no legal effect unless it continued for a period of at least two years. At no time was the application for the patent in suit without claim 2 for a period as long as two years, it having been inserted about one year after the filing date of the application, January 16, 1908.

Claim 13, also inserted on February 1, 1909, was erased on May 23, 1912. But the claims in suit, which are of substantially the same scope as claim 13, were introduced approximately one year later and, hence, cannot be attacked under the doctrine of *Chapman* v. *Wintroath*, *supra* (Finding VIII, Rec. pp. 10-13).

5.

The Question of Law, Presented in the Petition as Question 5, Is Also Fictitious.

The second fictitious question of law is presented as Question 5 of the petition (p. 2) and argued at (e) petition (p. 13). This Court has answered this question completely in *Overland Motor Co.* v. *Packard Motor Co.*, 274 U. S. 417, in which one of the questions certified was as follows:

> "Did the applicant, in canceling the claim which was finally rejected on May 20, 1911, abandon such claim or estop himself from thereafter seeking it through a new application?" (p. 420).

On page 421 the Court said:

> "As the Patent Office by granting the patent must be held to have waived any objection to the application on the ground that the claim allowed had been rejected before by that Office, there is no reason why the appellees below should not be allowed to avail themselves of the waiver. We answer the first question in the negative."

On page 14 of the petition the petitioner states:

> "* * * where an applicant for a patent to cover a new combination is compelled by the rejection of his application by the Patent Office to narrow his claim by the introduction of a new element, he can not after the issue of the patent broaden his claim by dropping the element which he was compelled to include in order to secure his patent. * * *"

This may be instructive as a matter of patent law, but applies to nothing whatever within this case. Claim 13, as presented on February 1, 1909, is identical in substance with the claims here in issue. None of these claims has required any expansion whatever to cover the petitioner's airplanes. The claims in suit added no element which respondent was compelled to "drop" and none has been pointed out by petitioner. Furthermore, claim 2, as before stated, was con-

tinuously in the application from February 1, 1909 (Finding VIII) to the date of issue of the patent and is now in the patent and held to be infringed.

In view of the foregoing facts there can be no estoppel. Hence, there is no point of law left for consideration.

6.

The Question of Law, Presented in the Petition as Question 7, Is Also Fictitious.

Petitioner admits (Petition, p. 16) that under Section 4923, R. S. (U. S. C., Title 35, Sec. 72) if the patentee is an American his patent cannot be questioned because of anything which happens in a foreign country if the happening does not amount to a printed publication or a patent, but urges (Petition, p. 6; Assignment of Error 7) that where the patentee is a citizen of a foreign country the ruling should be different. This is an absurd contention. Section 4923 makes no distinction whatever between an American citizen and an alien. It would be distinctly judicial legislation to limit the provisions of this section to an American patentee. The provisions of this section constitute one of the oldest principles in the American patent law. Section 7 of the Patent Act of 1836 provides that a patent shall be allowed

> "* * * if * * * it shall not appear to the Commissioner that the same had been invented or discovered by any other person *in this country* prior to the alleged invention or discovery thereof by the applicant, or that it had been patented or described in any printed publication in this or *any foreign country.* * * *" (Italics ours.)

In the general revision of the patent statutes, approved June 22, 1874, Section 4886 provided that any person who had invented a device

> "* * * not known or used by others in *this country,* and not patented or described in any printed publication in this or any *foreign country,* before his invention or discovery thereof * * *" (italics ours)

might obtain a patent.

Substantially the same provisions exist to-day in Section 4886 (U. S. C., Title 35, Sec. 31), which provides that any person may obtain a patent if the invention is

> "* * * not known or used by others in *this country,* before his invention or discovery thereof, and not patented or described in any printed publication in this or any *foreign country,* before his invention or discovery thereof * * *." (Italics ours.)

Petitioner, by its 7th assignment of error (Petition, p. 6) as elaborated (Petition, 4(g), p. 16), is apparently seeking from this Court a ruling which would amount to a judicial amendment of one of the most ancient and plainest provisions of our patent law.

We submit that the petitioner here is limited to the three points of law which it has presented. None of them can be properly based on the findings of fact in this case.

There were no special conclusions of law made by the Court, and the points which have been presented were apparently extracted by the petitioner in an endeavor to conform to the rule that only questions of law will in any event be considered by this Court on writs to the Court of Claims.

All of the other alleged errors relate to questions of fact and are not reviewable here.

7.

This Case Involves Nothing but the Questions of Validity and Infringement.

It follows from the foregoing discussion that with the fictitious questions of law out of the case, as they should be, nothing remains except the fact questions of validity and infringement. These questions were determined by the Court of Claims on most voluminous evidence. If any other law points arose in the Court of Claims decision, the petitioner evidently agrees with that Court's conclusions regarding them, *since petitioner has not raised any objection thereto.*

Reasons Alleged for Granting the Writ.

The petitioner alleges four reasons for granting the writ, these being as follows:

> 1. That the decision in *Esnault-Pelterie* v. *Chance Vought Corporation,* 66 Fed. (2d) 474, conflicts with the Court of Claims decision in the case at bar;
>
> 2. The "momentous importance of this case both to the Government and to the entire aircraft industry";
>
> 3. The avoidance of a costly accounting proceeding if a writ of certiorari is presented at this stage of the case; and
>
> 4. The errors in the Court of Claims decision.

We will examine these briefly under similar headings.

Esnault-Pelterie v. *Chance Vought Corporation.*

We submit that the decision in the *Chance Vought* case has no bearing whatever upon the question of review by this Court of the case at bar.

This case is a Court of Claims case, and governed by the statutes and decisions relating to Court of Claims cases (considered at pp. 3-4, *supra*).

The Court of Claims is a *legislative Court,* not acting under the Third Article of the Constitution, and the power of review of this Court over its judgments is strictly limited (*Williams* v. *United States,* 289 U. S. 553-581).

The statutes and decisions with regard to cases in the Circuit Courts of Appeal are very different. Circuit Courts of Appeal are *constitutional courts,* as to which the power of review possessed by this Court is practically unlimited.

Section 347 of the United States Code (U. S. C., Title 28) provides:

> "(a) In any case, civil or criminal, in a circuit court of appeals, or in the Court of Appeals of the District of Columbia, it shall be competent for the

> Supreme Court of the United States, upon the petition of any party thereto, whether Government or other litigant, to require by certiorari, either before or after a judgment or decree by such lower court, that the cause be certified to the Supreme Court for determination by it with the same power and authority, and with like effect, as if the cause had been brought there by unrestricted writ of error or appeal."

Under this statute all evidence, questions of fact, questions of law, and mixed questions are subject to investigation and review by this Court. Any cause can be brought before the Court at any stage in the proceedings.

It is, hence, entirely within the scope of review of this Court to inquire minutely into the facts, decide on the credibility of witnesses and weight of evidence, and settle all questions once for all which are present either in the facts or the law.

Under this power this Court has for many years, almost as a matter of course, certified to it patent cases involving conflicting decisions of the several courts of appeal.

But where, under a statute such as Section 288 of the Judicial Code, this Court may not inquire into the facts, the existence of another decision on other evidence in another case cannot, we submit, alter the power of review of this Court.

We find no decision of this Court to the contrary.

The state of facts in the case at bar is highly illustrative. This case has been pending over ten years; the facts were very carefully adduced and fully considered. The findings were initially made by a commissioner of the Court of Claims and largely adopted, without dissent, by the five Judges composing that Court. The Court of Claims has painstakingly gone over all of the evidence before it, which was voluminous. It has with meticulous care considered each and every point raised by the petitioner and has written an exhaustive and illuminating opinion. As shown by the transcript of record, the findings of fact and opinion of the Court occupy nearly seventy closely printed pages.

The decisions of the District Court and Court of Appeals in the *Chance Vought* case were fully argued and briefed before the Court of Claims, and that Court, on pages 61, 62, 66 of the transcript of record, concludes that the evidence before the Court of Appeals must perforce have been very different in most important respects from the evidence before the Court of Claims.

It was certainly open to Congress to provide that whenever a decision of the Court of Claims was at variance with a decision in any of the Federal Courts of Appeal, the Supreme Court should review the entire case, facts and law, on the full record. But Congress has not chosen to do so. It has made the findings of the Court of Claims final and, unless it has committed an error of law reviewable by this Court, the United States is committed to its decisions.

This Case Is Not of "Momentous Importance Both to the Government and to the Entire Aircraft Industry."

Of course this case is of importance to the Government in that it is facing payment for values which it has taken from the respondent, a large part of the taking being after due notice (Finding XX, Rec. p. 22). But this is the ordinary "importance" which attaches whenever the Government infringes a patent. Before February 13, 1925, Congress deemed cases of infringement of patents to be important enough to be subject to the review of this Court as a matter of right. Since that date, however, Congress is content to take the final judgment of the Court of Claims where it has committed no error of law. Our understanding is that this Court rarely, if ever, grants a writ of certiorari solely on the ground that the case is of importance to the defeated adversary. There must be, as we understand it, some general and substantial question of public interest, even in those cases where the power of review of this Court is absolute. (See *Layne & Bowler Corp.* v. *Western Well Works, Inc., et al.*, 261 U. S. 388.)

The practical importance of the patent in suit to the aircraft industry or anyone else in the United States is *nil.*

The patent expired approximately four and a half years ago (on November 3, 1931), and there are no suits pending other than the suit at bar. While, theoretically, this respondent could bring an action or actions at law covering the very short period of infringement left by the statute of limitations, the period of time covered is so small that such an action or actions would probably not pay for the bringing. This is particularly true when it is borne in mind that each action at law would require the aid of a suit in equity.

Such an interest on the part of the public is not substantial. But, even if it were, it is not seen how it could modify the provisions of Section 288 (U. S. C., Title 28) or overturn the clear decisions of this Court.

Grant of Petition Upon Interlocutory Judgment.

In its decision in this case, dated November 4, 1935, the Court of Claims filed its findings of fact and a single conclusion of law to the effect that plaintiff was entitled to recover (Rec. p. 5, par. 5), the parties having previously stipulated (Finding XXIII [misnumbered XXVIII], Rec. p. 25) that the accounting should be deferred until after adjudication by the Court of Claims of the questions of validity and infringement. For this reason no judgment of the Court of Claims was made at that time, it not being the custom of that Court to enter interlocutory judgments.

The defendant then moved the Court to enter an interlocutory judgment, giving as its reason for such judgment that it desired to petition this Honorable Court for a writ of certiorari without waiting for the accounting and final judgment. Based solely upon this showing of expediency, the Court of Claims granted the motion and entered the interlocutory judgment shown on page 75 of the record.

There thus arose the question of whether or not an interlocutory judgment of the Court of Claims is such a judgment as is contemplated by Section 288 (U. S. C., Title 28), or whether a judgment of that Court is unreviewable by this Court unless it is a final judgment.

If the respondent's position is of any consequence in the determination of this question by this Court, then respondent waives any objection to the timeliness of this petition; respondent believes that if a review by this Court is proper at all, there is no good reason why a long accounting proceeding should be conducted in advance of such review.

But respondent believes that the only question of law presented, as stated in the Court of Claims original conclusion, is whether or not the respondent, having a valid and infringed patent, should recover. This, of course, in reality is no question at all, since it is provided for in the statute.

Alleged Errors of the Court of Claims.

A discussion of alleged errors commences on page 9 of the petition and extends to page 17. It runs parallel with the specifications of errors on pages 5, 6 and 7 of the petition. We will reply, giving the number assigned to each individual specification of error and the letter of the paragraph, "(a)" to "(h)," which applies to the elaboration of each. Where our reply would duplicate previous discussions in this brief, we will so indicate.

1st Error, Paragraph (a). This relates wholly to a question of *fact*,—namely, that of validity. The facts are found regarding the Wadsworth patent in Finding XXXII, Rec. p. 30; Weeber, Finding XXXIII, Rec. p. 30; Wilson, Finding XXXVI, Rec. p. 30; Simpson, Finding XXXVII, Rec. p. 31. These patents were fully considered in the Court of Claims opinion: *Wadsworth,* Rec. p. 55; *Weeber,* Rec. p. 65; *Wilson,* Rec. p. 65; and *Simpson,* Rec. p. 64.

The art relating to airplanes was considered by the Court as follows: *Laroze,* Finding XXVIII, Rec. p. 28; *Penaud & Gauchot,* Finding XXV, Rec. p. 26; *Macedo,* Finding XXVII, Rec. p. 27; *Schüssler,* Finding XXIX, Rec. p. 29; *Jung,* Finding XXX, Rec. p. 29; *Davidson,* Finding XXVI, Rec. p. 26; and *Quentin,* Finding XXXV, Rec. p. 31. They were considered by the Court in its opinion as follows: *Laroze,* Rec. p. 62; *Schüssler,* p. 63; *Penaud & Gauchot,* p. 66; *Macedo,* p. 66; *Jung,* p. 66; *Quentin,* p. 66; and *Davidson,* p. 66.

2nd Error, Paragraph (*c*). This relates to a question of *fact*,—namely, the scope of the claims in suit,—and, as such, is not reviewable. It is referred to in Finding XXI, Rec. p. 22, and Finding XXII, Rec. p. 24; also in the opinion, Rec. pp. 71-75.

3rd Error, Paragraph (*b*). This relates wholly to a question of *fact*,—namely, the question of validity of the patent in suit over respondent's first French patent. It is referred to in Finding IV, Rec. pp. 7 & 8; also in the opinion, Rec. pp. 41-44.

4th Error, Paragraph (*d*). This has already been fully discussed, *supra*, page 7. While, ostensibly, a point of law, it is based upon alleged statements of facts which are untrue, and the true facts admit no such legal question.

5th Error, Paragraph (*e*). This has already been discussed *supra*, page 9. A comparison of, say, claim 5 or 6 with claim 13, which was erased, will show that the patented claims are substantially the same as the erased claims; their reinsertion was permitted by the Patent Office, and the action of the Patent Office is not reviewable. If the Patent Office had refused to permit their reintroduction, it would be on the theory of a species of *res judicata*. The doctrine of estoppel has no application.

6th Error, Paragraph (*f*). This is a question of *fact* which the Court of Claims has disposed of completely (Findings XVI, XVII and XVIII, Rec. pp. 20, 21 and 22). The criticism is not based upon the joy-stick combination set forth in the patent, but upon incidental and negligible crossed responses. All airplanes, even the most modern, have such crossed responses. They are inevitable. The 6th error is merely a trumped-up argument made for the purpose of this suit. It was proven false by test flights of plaintiff's ring-tail structure (Finding XVII, Rec. p. 21); see Record, page 75, where the Court disposed of it completely.

7th Error, Paragraph (*g*). This is a point of law completely disposed of on page 10, *supra*.

8th Error, Paragraph (h). This relates to the question of infringement, which is a question of fact. As we have before pointed out, the Court of Claims held that on the facts of the case there was infringement. The Government planes have all of the elements of the patented claims in issue, which elements operate in the same manner to produce the same result. Each of the Government planes has a single vertical lever movable in all directions: lateral stabilizing organs, which comprise hinged ailerons whose function it is to distort the aerodynamic effect of the wings; a longitudinal stabilizing organ, in the ancient form of a horizontal hinged elevator; the lateral and longitudinal stabilizers being both operated by a single joy-stick under the control of one hand of the pilot, so that the plane may be stabilized as to its lateral or longitudinal attitude, or as to any intermediate or compound attitude, by a single movement of the joy-stick. The Government planes have the simple and very effective responses described in the patent, so that the plane follows the tilt of the stick. Notwithstanding the petitioner's criticisms of instinctive operation, the Government has never built a plane or had one built for it, so far as this record shows, which did not utilize respondent's instinctive mode of operation. The claims in suit read directly and positively, without any expansion or broadening whatever, upon the Government structures. A plainer case of infringement has seldom been before the courts (see Findings XXI and XXII, Rec. pp. 23 and 24).

The *Chance Vought* Decision, Being on a Different Record, Has No Bearing on the Case at Bar.

The decision of the Court of Appeals, speaking through Judge Manton, was thoroughly argued before the Court of Claims. On page 61 of the Record, the latter Court stated as follows:

> "From the statements of facts in both opinions we are confirmed in our belief that the record before this court must be in some important particulars very different from what it was before the courts mentioned (District Court and Court of Appeals)."

The Court of Claims then points out several very important differences. These differences have to do with the applicability of the respondent's first 1906 patent, the operability of the patent in suit and the extent of use of the invention.

If the Court of Appeals decision had been *based upon the facts as adduced in the case at bar it would be completely and manifestly erroneous.* Statement after statement is negatived by the evidence in this case. As illustrations, the following statements from the Court of Appeals decision are found to be incorrect under the evidence in the case at bar; they are illustrative only:

> That the right-hand lever of the patent is the same in function and operation as the right-hand lever of respondent's 1906 French patent (see Finding IV, Rec. pp. 7, 8; Op., Rec. p. 41);
>
> That the actions of the steering rudder and elevator in the patent are interdependent (Finding XVII, Rec. p. 21; Op., Rec. p. 74);
>
> That the "bird-tail" construction of the patent in suit steers right or left, sometimes in response to corresponding, and sometimes in response to opposite, movements of the steering lever (Finding XIV, Rec. p. 8; Op., Rec. p. 45);
>
> That the equilibrium of respondent's first French patent may be controlled by the pilot with one hand (Finding IV, Rec. p. 8; Op., Rec. p. 43);
>
> That two out of three of the embodiments of the patent do not involve instinctive control (Finding XIII, Rec. p. 16; Op., Rec. p. 49);
>
> That instinctive control was not used by the patentee (Finding VI, Rec. p. 9);
>
> That the Laroze control could be operated by one hand (Finding XXVIII, Rec. p. 28; Op., Rec. p. 62);
>
> That the Ferber publications show any operating mechanism whatever (Finding XL, Rec. p. 33; Op., Rec. p. 67);
>
> That turning the lever of respondent's first French patent to a vertical position would make it operative (Op., Rec. p. 59);

That the infringing machine has inherent stability, requiring no hand-controlled stability (Findings XXI and XXII, Rec. pp. 22-24; Op., Rec. pp. 73-74);

That the joy-stick has not gone into extended use (Finding XLVII, Rec. p. 37; Op., Rec. p. 60).

The findings of the Court of Claims establish the incorrectness of these and other statements of the Court of Appeals decision.

Meritorious Character of the Invention in Suit.

As is apparent from the findings of fact and opinion of the Court of Claims, the invention in suit introduced for the first time in the art:

(1) An airplane control in which the equilibriums were under a single hand and required but a single mental concept to alter the position of the plane from any attitude which was not wanted to any attitude which was required in the exigencies of flight;

(2) An instantaneous control of equilibrium, free from all confusion, which left one hand available for other essential purposes;

(3) A control in which the movement of a single lever toward the high part of the plane would guide it back to normal attitude, or, in other words, one in which the tilt of the plane followed the tilt of the stick; and

(4) A control in which the pilot was not fighting his balancing instincts, but, on the contrary, took advantage of them, so that a balancing motion of the pilot's body carried with it the control stick in a direction to correct improper attitudes of the plane.

No prior art patent showed any one of these advantages. The petitioner's planes have always used this identical mechanism operating in precisely the same way, the differences in construction being merely those of mechanical details.

The Decision of the Court of Claims.

This Court will undoubtedly compare the opinion rendered by the Court of Claims in the case at bar with the opinion of the Court of Appeals in the *Chance Vought* case. We welcome any comparison.

The Court of Claims opinion, written on the facts which it had before it, is unusually complete, meticulously careful, and we think intrinsically convincing that no careful Court, upon the evidence in the case at bar, could have arrived at any other conclusion as to facts and law than those which were adopted.

CONCLUSION.

It is submitted—

(1) That the facts found by the Court of Claims, including the facts of validity and infringement, are not subject to review;

(2) That respondent has referred to no real errors of law which would justify the issuance of the writ asked for;

(3) That the decision in the *Chance Vought* case, being based upon radically different facts, constitutes no reason for the issuance of the writ;

(4) That there is no question of law, either proposed or inherent, which is of any public interest whatever;

(5) That the interests of the defendant are merely those of a defeated litigant, and that there is no sub-

stantial right remaining in this respondent which could become of importance to the public at large;

(6) That the petition should be denied.

Respectfully submitted,

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New York, May, 1936.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1936

No. 41.

UNITED STATES OF AMERICA,
Petitioner,

vs.

ROBERT ESNAULT-PELTERIE,
Respondent.

BRIEF FOR RESPONDENT

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INDEX.

PAGE

STATEMENT 1

Physical Conditions Attending Flight 2
Balancing or Stabilizing Organs 5
Use of Ailerons and Elevator in Maneuvers 9
The Invention of the Patent in Suit 10
Ring-Tail 11
Bird-Tail 13
Operation and Advantages of the Invention in Suit 15

FINDINGS AND OPINION OF THE COURT OF CLAIMS 21

PETITIONERS'S BRIEF 24

SUMMARY OF PERTINENT FACTS AS FORMED BY THE COURT OF CLAIMS WHICH ARE NOT SUBJECT TO REVIEW 26

ARGUMENT 31

A. Prior Patents 33
B. Prior Patents Not in Analogous Arts 40
C. Respondent's Device Involves Invention of High Order 41
D. The Instructive Character of the Joy-Stick Control 42

The Patent in Suit Should Not Be Limited to the Ring-Tail and Bird-Tail Constructions Shown . . . 48
The Joy-Stick Mechanism Shows Clear Invention Over Respondent's 1906 French Patent 54
Disclosure Supports Claims in Suit 60
The Patent Is Not Invalid on the Ground that the Claims in Suit Were Not Inserted in the Application until Five and a Half Years after Filing, while the Device Came into General Use Prior to that Date 62

PAGE

Respondent Did Not Acquiesce in the Rejection of Claim 13 and Is Not Now Estopped from Asserting that the Claims of the Patent in Suit Should Be Construed to Cover the Vertical Control Lever. 67

Petitioner's Contention that Esnault-Pelterie Was Not the Inventor of the Airplane Control Lever Is Clearly Wrong. 71

Infringement—The Patent in Suit Is Clearly Infringed 75

The Use of a Patented Device for Any Cognate Purpose Is an Infringement. 87

Errors in the Decision of the Court of Appeals in the Chance Vought Case. 89

The 1906 French Patent Is neither Prior Art nor the Equivalent Thereof. 95

Conclusion. 99

APPENDIX. 105

Section 288. 105

Section 4886, R. S. 105

Section 4887, R. S. 106

Section 4923, R. S. 107

CITATIONS.

	PAGE
Acme v. Commercial, 192 Fed. 321	98
Atlantic Works v. Brady, 107 U. S. 192	59
Bischoff v. Wethered, 76 U. S. 812	22
Chapman v. Wintroath, 252 U. S. 126	66
Esnault-Pelterie v. Chance Vought Corp., 56 Fed. (2d) 393 (D. C.)	32
Esnault-Pelterie v. Chance Vought Corp., 66 Fed. (2d) 474 (C. C. A.)	1, 81
Fireball v. Commercial, 239 U. S. 156	98
General Electric Co. v. Alexander, 277 Fed. 290 (aff'd 280 Fed. 852)	98
Hennebique v. Myers, 172 Fed. 326	98
Jones v. Freed-Eisemann, 47 Fed. (2d) 174	66
Leeds & Catlin v. Victor, 213 U. S. 301	98
Luckenbach v. United States, 272 U. S. 533	22
Overland v. Packard, 247 U. S. 417	67
Permutit v. Graver Corp., 284 U. S. 52	48
Powers-Kennedy Contracting Co. v. Concrete Co., 282 U. S. 175	40
Royer v. Shulz Belting Co., 135 U. S. 319	22
STILZ V. UNITED STATES, 269 U.S. 145	22
Thomson Spot Welder Co. v. Ford Motor Co., 265 U. S. 445	22
Victor v. Haschke, 188 Fed. 326	98
Westinghouse v. Jeffrey-DeWitt, 22 Fed. (2d) 277	66

IN THE

Supreme Court of the United States

OCTOBER TERM, 1936.

UNITED STATES OF AMERICA, Petitioner, v. ROBERT ESNAULT-PELTERIE, Respondent.	No. 41.

BRIEF FOR RESPONDENT.

Statement.

The case at bar is a suit for infringement of a patent to Robert Esnault-Pelterie for Improvements in Aeroplanes, No. 1,115,795, dated November 3, 1914. It originated in the Court of Claims on June 20, 1924, and was decided by that court favorably to respondent (on November 4, 1935) as to all of the claims in suit (viz., claims 2 and 5 to 9), holding the latter valid and infringed. The findings of fact and decision of the Court of Claims are before this Honorable Court in the transcript of record.

The petition herein invoked the extraordinary jurisdiction of this Court on account of the fact that the same patent had been held by the Court of Appeals for the Second Circuit, in the case of *Robert Esnault-Pelterie* v. *Chance Vought Corporation* [66 Fed. (2d) 474], to be so limited in scope as not to be infringed by certain conventional airplanes manufactured by the Chance Vought Corporation. So far as we are aware, this is the first suit brought before this Court under circumstances where a patent has either

been held invalid or so restricted in scope as to avoid infringement in a Circuit Court of Appeals and subsequently held to be valid and infringed in the Court of Claims.

To intelligently discuss the issues here involved requires that the Court shall first understand the physical conditions which prevail in the art of flying heavier-than-air airplanes, the nature and character of the invention in suit, and the results attained thereby.

Physical Conditions Attending Flight.

An airplane is enabled to fly by the reaction of the air against the under side of its wings, and requires that the plane shall move forwardly at a rapid speed through the air—either by the action of a fast-revolving propeller, as in normal flight, or by the action of gravity, as when the plane is gliding downward. To maintain the plane in the air, the wings invariably are given a slight angle to the horizontal, the front or leading edges of the wings lying higher than the rear or trailing edges. This is called the "incidence" of the wings, and their angle is called their "angle of incidence."

Every airplane has a tail surface of some sort—this being a horizontal surface of some proportions, which assists in balancing the plane longitudinally.

Every airplane must, of course, be provided with a steering rudder, which is practically identical with the steering rudders of marine vessels—being a plane surface, usually pivoted vertically, at the rear of the airplane, and designed to alter the course of the airplane to the right or to the left. Mechanically speaking, it turns the airplane around a vertical axis in either direction. The specific construction of the steering rudder and its specific operating parts are not of importance in this case. The steering rudder may be operated by the hand of the pilot, or by his feet, or in any other suitable way. Steering is not a vital control in flying so far as the safety of the airplane is concerned.

An airplane is in equilibrium, generally speaking, when all of the forces acting upon it (such as air-reaction, gravity,

centrifugal force, etc.) balance each other on both sides of its longitudinal axis and both sides of its horizontal transverse axis.

To fly at all requires that this balance shall be substantially maintained at all times. This is true, irrespective of whether the plane is flying level, or whether it is banking, turning, looping, diving or executing any other maneuver.

A plane may be temporarily unbalanced if it is very quickly brought back to equilibrium again.

If an airplane merely had to fly through a wholly undisturbed medium, such as perfectly calm air, the problem of flight would have been solved much earlier than it was.

But such perfectly immobile air is never encountered near the earth. Normal air is marked by a very considerable degree of turbulence—even in very light winds, or when the weather appears very calm. It is increased by any substantial wind.

This state of turbulence is produced by air currents, gusts, swirls, eddies, updrafts, and the like, which take place completely at random. Their direction, force and succession are wholly unpredictable by the pilot. They act against the wings, fuselage, tail, etc., of the plane almost always to unbalance it. The air surfaces of a plane, such as the wings, are large, and the leverages at which the air disturbances act are hence great. It is small wonder, therefore, that an airplane is in constant danger of losing its equilibrium. It was this necessity for the preservation of equilibrium which delayed actual flight for many years.

The Wright brothers, fathers of flying, stated in 1908 that the crucial problem of flying had proven to be

> "exactly what we knew it must be—the question of equilibrium" (Rec. p. 58).

To keep an airplane aloft requires a certain flying speed (now from 40 to 80 or more miles per hour). This flying speed is not a mere desirability—it is absolutely essential. A plane cannot take off from the ground without reaching its flying speed, and it cannot land unless it maintains it

up to the time the plane contacts with the ground (or water, in the case of sea-planes).

When a plane falls below its flying speed in the air, it does not slowly and safely glide to the ground. On the contrary, the entire phenomenon of flight collapses, and the plane falls precipitately to the ground.

The same is true when a plane loses its equilibrium to an extent that it cannot be restored. The plane becomes quickly out of control; frequently it loses its flying speed, and a crash is almost inevitable.

The turbulence of the air tends to upset or tilt the plane *in any direction.* Worse than this, one gust or swirl is frequently succeeded by another, and another, from different directions, in close succession. Flying is only possible when the pilot can instantly balance or stabilize his plane against them all.

Ever since the inception of the idea of flying, more than sixty years ago, attempts have been made *automatically* to maintain the plane in balance under all conditions; but, even down to the present time, no one has been able successfully to accomplish it. The only successful controls have been manually operated by the pilot.

It, hence, has always been due to the quick thinking and instantaneous muscular reaction of the pilot that heavier-than-air flying has been possible.

An airplane is built to fly normally in a level attitude, and its wings and other surfaces are constructed to maintain this attitude when undisturbed.

By a simple analysis it will be seen that when a plane departs from this level attitude it does so by turning around one or both of its major axes. That is to say, when its nose is moved upward or downward the plane in effect turns or inclines around a horizontal transverse axis, which is usually amidships, although it may be displaced toward either end. This is familiarly called "pitching" or "nosing" up or down.

When the plane is turned sidewise, so that one wing is higher than the other, the turning or inclination is around

a longitudinal axis of the plane—usually its central longitudinal axis. This is familiarly called "rolling" or "banking."

Balancing or Stabilizing Organs.

It was early recognized—even in the theoretical art which preceded actual flight—that if an airplane was to be stabilized, or restored to balance when it departed therefrom, it should be provided with two movable organs, each of which organs is designed to turn or incline the plane around one of the axes just described. Each organ operates by increasing or decreasing its angle of incidence to the line of flight, so as to produce a greater or less aerodynamic effect upon the plane to cause it to incline or turn around its appropriate axis and thereby stabilize it.

The organ which was provided for inclining the plane around its horizontal transverse axis is known as an "elevator," or ascensional rudder or horizonal rudder [hereinafter, for simplicity, called an "elevator"]. It is usually hinged to the fuselage of the plane at the tail thereof, and by moving its free rear edge upwardly it causes the tail to tilt downwardly and the nose upwardly. By depressing the elevator, a reverse action takes place and the plane noses down.

The organ which was provided for inclining the plane around its longitudinal axis was, for convenience, in two parts—one part being situated at each of the tips of the wings. It comprises portions of the wings, which are bodily distorted to increase their incidence or angularity. In some cases the wings are distorted by being bodily warped. In other cases they are distorted by hinging portions of the tips and swinging such hinged portions. Such hinged sections constitute what are known as "ailerons." In either case the wing is distorted from its normal form to increase its lift or decrease it (usually one is increased in angularity and the other decreased). The plane is, hence, caused to roll around its central longitudinal axis, as before described.

The essential feature is that one wing shall be in some way distorted to increase its incidence over the other (or *vice versa*). Since there is no real dispute in this case that distorting the wings by warping is the equivalent of distorting them by ailerons, we shall usually refer to "ailerons" or "aileron action," or similar terms, as a more modern or convenient way of expressing the ideas involved. The patent in suit illustrated the invention as applied to planes whose wings were warped (see Finding XXII).

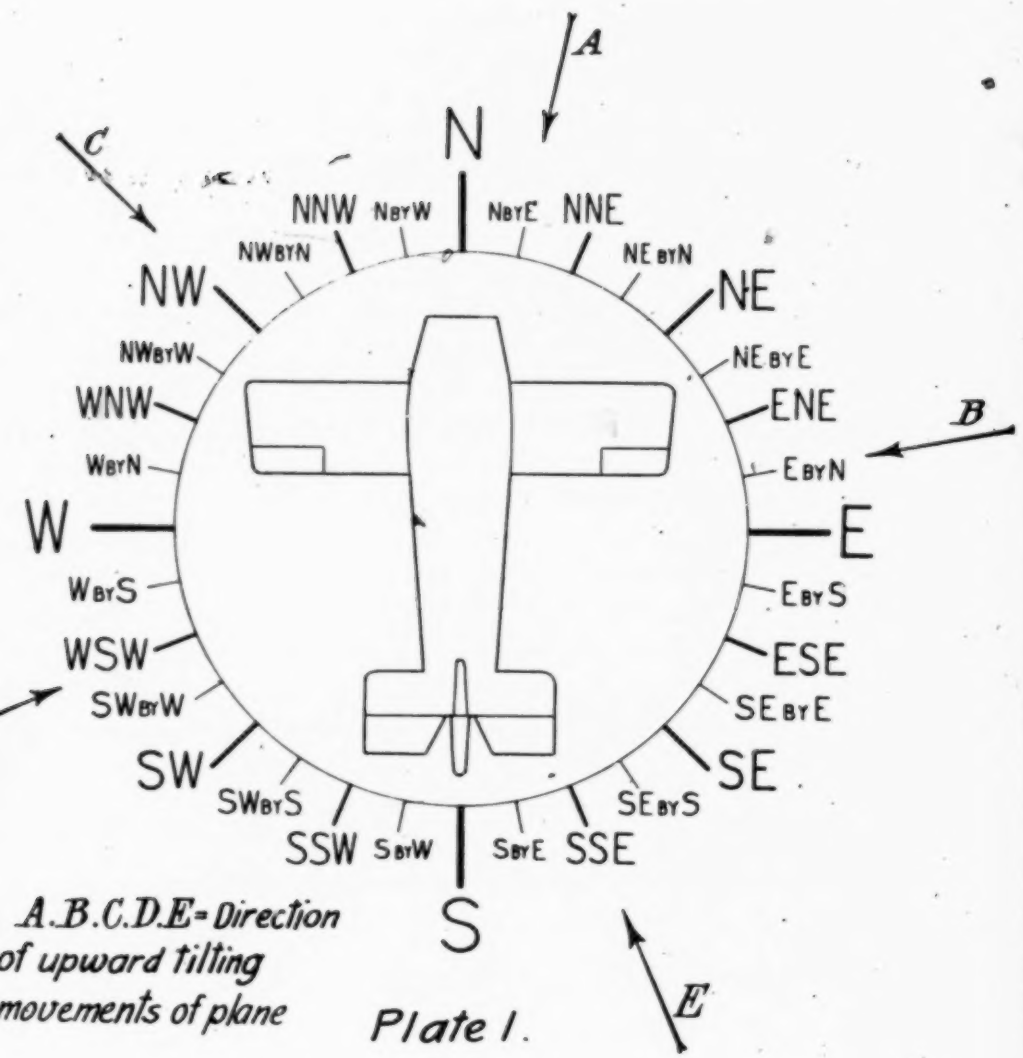
By these two organs (ailerons and elevator) the plane can be made to turn or incline about either axis alone, or about both axes to a greater or less degree, respectively.

If an airplane, therefore, is flying in a level condition and it is hit by a simple gust coming from any point in the compass, so that the plane is tilted or inclined in any direction, it is possible for the two stabilizing organs to be operated to restore it to a balanced condition at a level attitude. In so doing, the proportion of corrective effect that is given by manipulation of the ailerons may range anywhere from zero to 100%, while simultaneously the elevator may be operated to give from 100% effectiveness to zero. Of course, there are occasional disturbances of attitude which require the operation of only the ailerons or the elevator. But a great majority of the disturbances require a compound manipulation of both.

Illustrations of Disturbance in Balance.

We have diagrammatically illustrated conditions of disturbed balance or equilibrium in the cuts shown in plate I on the opposite page. In these cuts are shown the cardinal points of the compass.

In plate I is superimposed a diagrammatic illustration of an airplane headed due north. If an airplane be proceeding in this direction on a level keel in a condition of stability or balance, and a gust or other air disturbance should affect it—with the result that that portion of the airplane which points north-by-east, for example, is elevated or inclined upwardly, as shown by the large arrow marked



A.B.C.D.E= Direction of upward tilting movements of plane

Plate I.

"A"—it will be observed that two things have been done to the plane, viz., its nose has been forced upward by a movement around a horizontal transverse axis of the plane, and its right wing has been elevated, thus turning the plane around its longitudinal axis. The plane is thus unbalanced in two directions.

It will be noted in the illustration given that the nose of the plane has been elevated very considerably more than the plane has been rolled to the left. Hence to correct the tilt, the elevator action must be much greater than the aileron action. If we represent the total action of the two as a 100% corrective force, then in the particular instance given the elevator action will amount to about 87% of the total and the aileron action to about 13%.

These represent *proportions* only. They are not to be confused with the *magnitude* of the total correction. That is to say, the tilt of the plane may be very violent, throwing the head of the plane upward to an extreme angle; or the tilt may be quite moderate. In any event, however, so long as the two tilts are in the *same direction* (for instance, along the arrow A) the *relative proportions* of elevator correction and aileron correction will remain the same.

If the *magnitude* of the tilt is greater, then both elevator and aileron corrections, while remaining proportionate, will both be of an intensity to correspond with the increased magnitude.

Irrespective of the magnitude of the tilt, therefore, the proportions of elevator and aileron correction in the instance given are about 87% to 13%. Since the nose is elevated, the action must be *nose down* elevator, and since the left wing is depressed, the action must be *left-wing* action to stabilize the plane.

If the tilting movement of the airplane, instead of being at north-by-east, as indicated by the arrow "A," should be, for example, at east-by-north, as indicated by the large arrow "B"—then the main disturbance would be an inclination around the longitudinal axis of the plane, and the minor disturbance an inclination around the transverse axis. To

correct this would require approximately 87% of *left*-wing aileron action to roll the plane to the right, and only 13% of elevator action, forcing the nose *downward*.

If the upward tilt should be, let us say, at northwest, as shown by the large arrow "C"—with the result that the plane nosed upward and rolled to the right instead of to the left—then the proper correction is approximately 50% nose-*down* elevator action and approximately 50% *right*-wing aileron action.

If the tilt upward should be at west-southwest, as shown by the arrow "D," then approximately 75% *right*-wing aileron action would be required and approximately 25% nose-*up* elevator action.

If the disturbance were at south-southeast, as shown by the arrow E, then approximately 25% of *right*-wing aileron action would be required and 75% of nose-*up* elevator action.

These are merely illustrations, since the plane may be tilted upward at any point in the 360 degrees of the circle. All such disturbances can be corrected by a proper combination of aileron and elevator action.

In order to do so, however, requires an instantaneous selection of elevator action, either nose-upwardly or nose-downwardly; it also requires an instantaneous selection of aileron action, either right or left; and, finally, it requires such a selection in *all proportions of elevator and aileron action.*

But this is not all.

We have referred only to *simple* disturbances of the airplane, and have assumed a single and isolated gust hitting a level airplane.

In actual practice, however, it frequently happens that gusts succeed one another rapidly, and it also frequently happens that before a correction can be fully accomplished, other gusts hit the plane from different directions. The pilot, therefore, is constantly called upon to correct compound disturbances from one point and then immediately correct similar disturbances from another point or points.

All such unbalancing disturbances place the plane in an unstable condition, and, unless immediately corrected, in great danger.

The conditions were perfect for mental and muscular confusion on the part of the pilot, and flying an airplane was a very hazardous task.

At an appropriate place in this brief, the prior art relied upon by the petitioner will be discussed in detail.

It suffices to say here that prior to the accomplishment of actual flight, as well as after successful flight had been accomplished, many efforts had been made to produce a satisfactory combination of the two control organs and manually operable parts to be actuated by the pilot. There is no contention in this case that a really practical and efficient device had ever been produced prior to the respondent's invention in suit notwithstanding many prior proposals in prior art patents.

The Wright brothers, the pioneers of heavier-than-air flight, provided a notoriously inadequate equilibrium control system—so much so that the Court of Claims, on page 58 of the record, is moved to say:

> "If the ingenuity of scientists in this art had exhausted itself in the control mechanism of the Wright patent, it is not exaggeration to state, but clearly observable, that the modern airplane would never have been developed. * * *"

The Court's remarks apply equally to other attempts in the prior art.

Use of Ailerons and Elevator in Maneuvers.

All airplanes, in order to fly, must be capable of ascending, descending and banking. To ascend it is required that the pilot shall deliberately rotate or incline the plane to nose it up around its horizontal transverse axis. To descend requires that he shall incline it around this same axis to nose it down. To deliberately bank, or roll the plane, the pilot inclines the plane to the right or to the left around its longitudinal axis.

To do any of these things the pilot operates either the elevator or the ailerons, or both, in precisely the same way

that they are operated to incline the machine, nose down, nose up, roll right or left, to correct the attitude of the plane when the latter is disturbed, as has just been described.

Thus, whether the pilot utilizes the ailerons and elevator to incline the machine for correction or for maneuver, the operations are identical. In other words, the pilot uses exactly the same controls in exactly the same manner to produce the same inclinations, whether his objective is to keep the plane in balance at a level attitude or to change its attitude for some premeditated maneuver. It is not a case of organs performing two different functions; the elevator and ailerons each performs only a single function, and that single function is utilized by the pilot to incline the plane *for whatever purpose is desired by the pilot at the time.*

The Invention of the Patent in Suit.

We have already described the function of the old distortable wings such as warping wings or ailerons—which is that of turning or inclining the machine either to right or left around its longitudinal axis. We have also described the function of the old elevator—which is that of turning or inclining the machine around its horizontal transverse axis to nose it up or nose it down, or, in other words, to pitch the machine upwardly or downwardly.

The respondent, in the invention in suit, utilized these two old organs to perform their old and well-known functions.

He combined these organs with a single, universally-mounted lever wholly operable by one hand of the pilot for control of these organs. This was the first time that such result had been accomplished in the art. Others, perhaps, have approached it, but no one had accomplished it. This left the other hand of the pilot free for steering, throttle control, machine-gun fire, photography, writing reports, or any other duties imposed upon the pilot.

Respondent, further, segregated the steering control from the equilibrium control. He illustrated the use of a separate hand lever for this purpose. Steering is not ordinarily a vital control for safety, and the steering lever may ordinarily

be released without danger. With a hand steering lever, the foot is left free for the throttle. In modern planes steering is done by foot levers and the hand is left free for manipulating the throttle and other duties.

Perhaps more important than leaving one hand free, however, is the fact that by a single lever to control the inclination of the plane, the mind of the pilot is not confused by the necessity of two mental operations—one for the elevator, and one for the ailerons. Since a great majority of the operations of the control for equilibrium purposes are compound and involve both elevator and ailerons, the use of two hands imposes the necessity for two thoughts. This will be developed later.

Such single lever was *vertically arranged,* and the combination was such that when the lever was tilted forwardly, the elevator was tilted downward and the plane nosed downward. When it was tilted backwardly, the elevator was tilted upward and the plane nosed upward. When it was tilted to the *right,* the *left* wing was distorted to greater incidence and the plane turned or rolled to the *right;* and when it was tilted to the *left,* the *right* wing was distorted to greater incidence and the plane turned or rolled to the *left.*

Respondent's patented combination was such that any proportions of elevator and aileron action were obtained by the simple expedient of moving the lever in an oblique direction between forward and left or right, or between backward and left or right. That is to say, when the vertical lever was tilted in *any* direction, the effect was to incline the plane in *the same direction* as the lever was tilted. These unique responses have given rise to the phrases, "The plane follows the tilt of the stick," and "The plane tilts in the same way you tilt the stick"—which phrases are taught immediately to every student.

Ring-Tail.

The invention here in suit was based upon his second French application, which resulted in French patent No. 373,763, and was there shown as applied to an airplane hav-

ing a particular tail structure, known in the case at bar as the Ring-Tail. This is shown in Figs. 1, 3, 4, 5, 6 and 16 to 19 of the patent (Finding XIII, Rec. p. 17; op. p. 48).

In this construction respondent showed the old warping-wing type of lateral control. The longitudinal control organ was a two-part elevator which, so far as its effective aerodynamic structure was concerned, is identical with all elevators used in the practical art down to the present time. As before stated, an elevator is essentially a horizontal flap or surface hinged to the fuselage in some fashion so that its rear edge can be moved up and down. Its lower side is engaged by the stream of air when its elevator is down, thus forcing the plane to turn around its horizontal transverse axis to nose the plane down. When the elevator is swung up, its *upper* side is engaged by the air stream and the plane is turned around such transverse axis to nose the plane up.

The elevator of the ring-tail construction conformed to this description in all respects.

In detail it differed from the usual type—in that, instead of being mounted directly on the fuselage, it was mounted upon a ring, which in turn was mounted on the fuselage in such manner as to swing around the same horizontal axis as was the custom.

This elevator is connected to the same vertical lever which operates the warping wings, in the manner just stated, so that the complete control of all attitudes of the plane becomes resident in one hand of the pilot.

On the same ring which supported the elevator respondent mounted a two-part steering rudder, this rudder being essentially the same as steering rudders had theretofore been made. The only difference was that the common type of steering rudder had been mounted directly on the fuselage so as to swing around a vertical axis, whereas respondent mounted it on the common ring with the elevator and mounted the ring on the fuselage so that it would swing around such vertical axis.

Thus the ring-mounting for the elevator and steering rudder was given the capacity of swinging in two directions—one

around a horizontal axis for the elevator, and one around a vertical axis for the steering rudder.

But, while the elevator and steering rudder were mounted on the same ring, there their connection completely ended.

In no sense were they interconnected in any way. The steering movements were performed by a simple vertical lever arranged to be moved by the left hand of the pilot, the sole duty of this lever being to steer the plane.

The elevator movements were performed by the vertical lever, universally mounted, which also operated to warp the wings.

This lever, which speedily became known throughout the world as the "joy-stick," thus placed in one hand of the pilot the entire control of the attitude of the plane—with most important results, hereinafter referred to.

Bird-Tail.

In a later patent applied for in France on January 22, 1907 [Patent No. 373,818], this same joy-stick mechanism was applied to a very different form of tail structure, known in this case as the "bird-tail" structure. The patent in suit shows this structure in Figs. 7, 7ª, 8, 8ª and 10.

In the bird-tail form the old elevator and the old warping wings were both used in the same general form as they are to-day (ailerons being now substituted for the warping wings). With this familiar change, the bird-tail structure as an equilibrium or attitude control is substantially identical with all modern airplanes.

To lighten the plane, however, the respondent gave an additional function to the elevator, namely, that of steering. There was no necessity for this from the standpoint of the equilibrium control. Weight, however, was of great importance in the early days of flying, and it was solely to save the weight of a steering rudder that the supplemental function of steering rudder was given to the elevator.

As with the ring-tail form, this additional steering function did not in any way interfere with the functional independence of the equilibrium from the steering, and *vice versa*.

As with the ring-tail, the elevator and warping wing control was resident solely in the joy-stick, and the steering solely in a second, simple lever.

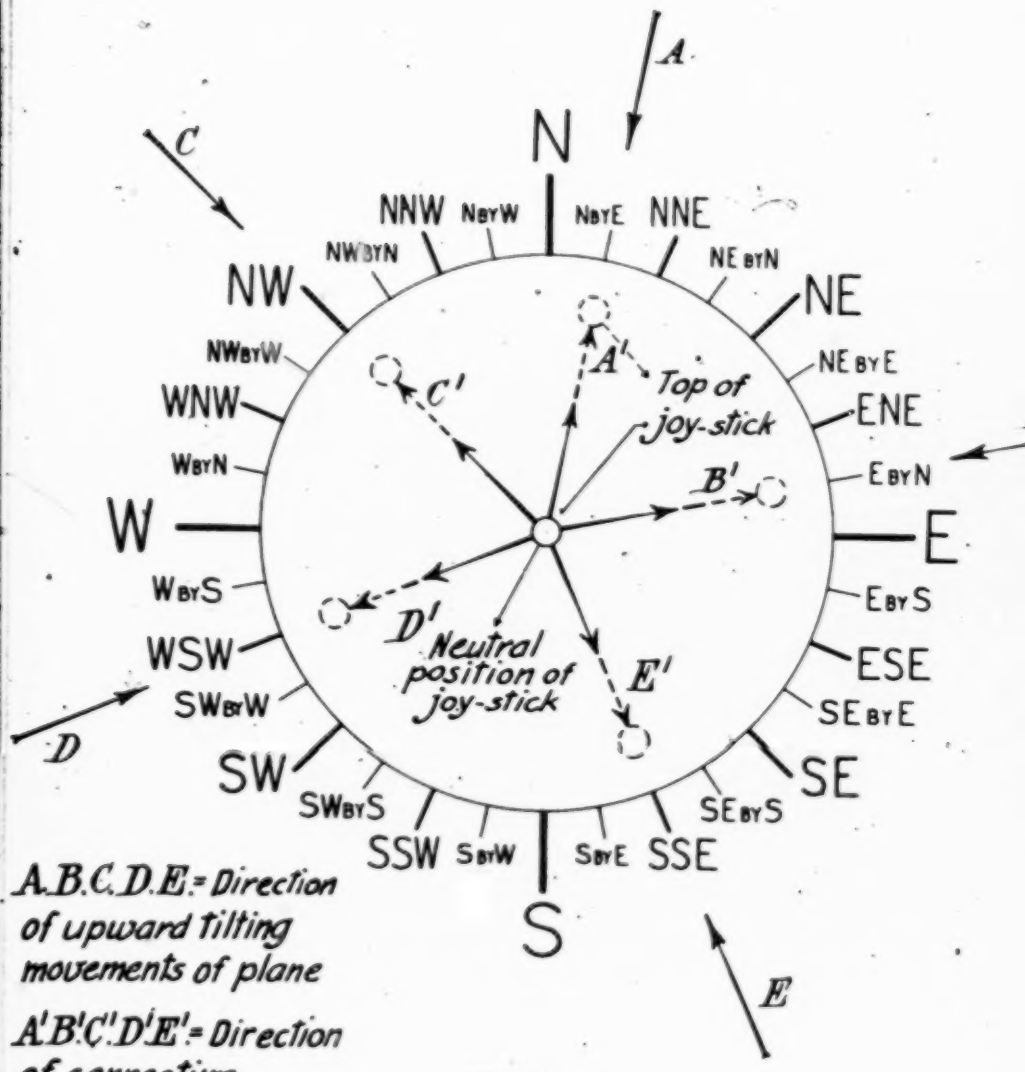
In each construction the respondent attempted to improve on the old separate elevator and steering rudder. In other words, he thought past the older forms, and essayed further improvements.

As motors of greater horsepower and lighter weight became available, the necessity for cutting down weight to the utmost in the airplane structure disappeared, and the ring- and bird-tail improvements became valueless.

In the first machine which respondent built and in which he made many flights, he utilized the lighter bird-tail form; but with better motors available, he soon went back to the old separately-formed steering rudder, and made thousands of planes in France using the joy-stick control.

In addition to the demonstration of the bird-tail by respondent, the ring-tail was amply demonstrated in July, 1931, by reconstructing about the cheapest plane on the American market (the "Aeronca") and flying it in many test flights, both *inter partes* and otherwise, during the trial of this case. The flights were completely successful and demonstrated that the joy-stick control of the equilibrium was separate and distinct from the steering control and that neither adversely affected the other. The same is true of the bird-tail; the findings are that the equilibrium was functionally separate from the steering, and *vice versa*, and that neither adversely affected the other (see Findings XIV-XVII).

Since the invention of the joy-stick control was essentially novel—quite irrespective of the particular and specific organs of lateral and longitudinal control—the patentee very properly claimed broadly the combination of lateral and longitudinal stabilizing organs and the single universal lever for manipulating them. None of the claims is limited to either the specific ring-tail or bird-tail embodiment.



A.B.C.D.E. = Direction of upward tilting movements of plane

A'B'C'D'E' = Direction of corrective movement of joy-stick

Plate 2.

OPERATION AND ADVANTAGES OF THE INVENTION IN SUIT.

This apparently simple invention solved in a remarkable way the problem of control of the airplane.

The Court will remember that the respondent started with two controlling organs, namely, the distortable wings, and the elevator. By his invention he produced a combination which in effect was the equivalent of *one single controlling organ*, operable at the will of the pilot to incline the machine in any one of an infinity of directions by a simple movement of the hand of the pilot in the direction in which the tilt was desired.

The two organs in question—namely, the distortable wings and elevator—had always been able to theoretically produce this physical result, if the degree and kind of aileron and elevator action were selected and proportioned accurately enough.

But never before had a single movement of one hand of the pilot been capable of producing any desired tilting movement of the plane in any direction required. And never before had the attitude of the plane been used as a direct index or indicator for determining the point toward which this single vertical lever should be moved.

The control of equilibrium by respondent's invention became simplicity itself. The pilot had only to observe which point of his plane was the highest and *move the lever toward that part*, or, to state it reversely, the pilot had only to move the lever toward that part *which he wished to lower*.

This is illustrated in plate 2 on the opposite page. This diagram is similar to plate 1 opposite page 6 and shows the joy-stick movements to correct the balance of an airplane when unbalanced at each of the five points shown in plate 1. A tilt of the plane at N by E as shown by the arrow A in both plates is corrected by a simple movement of the joy-stick from its central neutral position toward N by E as shown by the arrow A^1. Any other tilt, such as shown by the arrows B, C, D and E in both plates, is corrected by movements of the stick in the directions of the arrows B^1, C^1, D^1 and E^1, respectively.

The device has other remarkable advantages, which are as follows:

1. In the vital problem of balancing or stabilizing the plane, if a gust hits the plane in such fashion as to elevate the latter at any point in the circumference, as described, the pilot does not have to calculate mentally how much elevator control is required and how much aileron control, and whether nose-up or -down elevator, or right- or left-wing aileron is needed, and then translate this calculation into muscular action of his two hands. The invention does that for him, and tells him exactly where to move his single hand to make the desired combination of controls which will result in taking him out of a dangerous unbalanced condition. It is little wonder that respondent's invention very early in its history became known as the "joy-stick" control.

2. If the pilot desires to turn his machine around its longitudinal axis or its transverse axis, or any axis lying between the two, for the purpose of a premeditated *maneuver*, the operations have the same remarkable simplicity and directness. The pilot simply moves his hand to tilt the joy-stick in the direction in which he desires to tilt the plane, or, in other words, he tilts the joy-stick toward that part of the plane which he wishes to *lower*. The operation is precisely the same as when the pilot desires to tilt the plane back from an unwanted attitude, due to a gust or the like; *that is, he tilts the plane by moving the stick in the direction in which he wishes the plane to tilt.*

As hereinbefore stated, premeditated maneuvers are always made by the stabilizing mechanism, even in the theoretical art preceding flight. With the joy-stick mechanism in premeditated maneuvers—we have the same condition as in balancing, viz.: the pilot does not have to calculate how much right or left aileron and how much nose-up or -down elevator are required for a maneuver, and then translate these into accurate muscular reactions. He merely executes the simple movement of the joy-stick in the direction in which he wishes to tilt.

3. Another virtue of this invention is that it utilizes, and harmonizes with, the natural balancing instinct of the pilot. Every human being either has at birth, or speedily acquires, the instinct to balance himself in a vertical position. This is seen when one balances himself on a pitching vessel or a swaying train, or in many other conditions. If, for instance, a person is seated and his chair is tipped backwardly, he leans forwardly to maintain his vertical attitude. Conversely, if the chair is tipped forwardly, he leans backwardly; if it is tipped to the side, he leans to the opposite side.

In an airplane provided with the joy-stick control, if a gust hits the plane so as to nose it up, for instance, the pilot instinctively and automatically tends to lean forward. With his hand on the stick, this tends to tilt the stick forward. This is precisely the right movement of the stick to correct the unbalanced, nosed-up attitude of the plane. The same is true if the nose is thrown down or the plane is rolled to the right or to the left by air disturbances, or if it is thrown out of its proper attitude in any direction. The pilot leans in the direction from which the disturbance comes, which in turn moves the stick in the direction necessary to correct the altered attitude of the plane (Finding XII, Rec. p. 16; op. p. 50).

4. Notwithstanding the important results achieved by the joy-stick, as we have thus described them, the Court would not have an adequate idea of the virtues of the joy-stick if it conceived that the pilot sits in his cockpit with the joy-stick in neutral position, waiting either for an air disturbance or a wish to voluntarily change the attitude of the plane; that when the gust comes, or the wish seizes him to change his attitude, he moves the stick from neutral in the desired direction, and when the desired result is accomplished, he moves it back to neutral to await some subsequent disturbance or desire. This is not the case at all.

The control of the equilibrium of an airplane, particularly in gusty weather, and most particularly in taking off or landing, is quite similar to the steering of an automobile on a rough and uneven road—except that the airplane tilts in all directions and requires correction in all directions, while the automobile requires steering movements in only two direc-

tions. The similarity lies in the fact that the steering wheel of a motor car on a rough road is always being turned by the driver in one direction or another.

This is so with the joy-stick. One gust, swirl, cross-current or air pocket succeeds another rapidly. Before the correction for one disturbance is finished, another disturbance may be and frequently is upon the plane from a different direction. It is characteristic of the joy-stick that no matter in which direction it is tilted for a given correction, it can be moved *directly* in any other direction for the succeeding disturbance. Such movements are indicated or indexed by the attitude of the plane at the moment. Usually the movements of the stick are direct and in a straight line. But if the disturbances are such that they tend to move rapidly around the plane, so as to elevate different portions of the plane rapidly and successively, they can be corrected by similar movements of the joy-stick.

To put it briefly: The joy-stick does not require to be moved from neutral to any desired position. It will correct the attitude of the plane, or alter it to suit the desires of the pilot, *from any attitude to any attitude.*

In the opposite diagrammatic page we have shown a number of movements of the joy-stick. Figs. 1 to 4, inclusive, show simple longitudinal and lateral control movements. Figs. 5 to 8, inclusive, show compound longitudinal and lateral control movements. Figs. 9, 10 and 11 illustrate the facility with which any desired control can be accomplished, either by starting at neutral (corresponding ordinarily to a level condition of the plane) or starting *from* any attitude and moving *to* any attitude, by a simple movement of the stick in a straight line in one direction.

Fig. 12 shows a typical series of movements which occur in rapid succession within a very few moments, particularly in gusty weather or near the ground—such as in a taking-off operation. The Court will note that these are not a reproduction of any actual flight, but are illustrative merely—and to forestall any possible criticism, we would say that the amplitudes may be shown as over-extended for the purpose of clearness of illustration.

CONTROL MOVEMENTS OF JOY-STICK

Airplane is assumed to be pointed toward top of sheet

○ indicates top of stick in neutral position.

◌ indicates top of stick in displaced position.

⟷ indicates direction of manual control movement.

Pitch or "Nose" = Longitudinal control by turning plane around its horizontal transverse axis.

Roll = Lateral control by turning plane around its longitudinal axis.

Simple Pitching and Rolling Movements

Fig.1.

Nose Up

Fig.2.

Nose Down

Fig.3.

Roll Left

Fig.4.

Roll Right

Compound Pitching and Rolling Movements

50% Pitch - 50% Roll

(Other angular movements give all the way from 1% pitch and 99% roll to 99% pitch and 1% roll)

Fig.5.

Nose Up
Roll Left

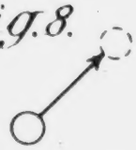
Fig.6

Nose Up
Roll Right

Fig.7.

Nose Down
Roll Left

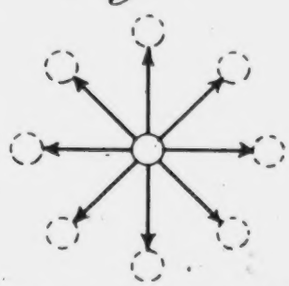
Fig.8.



Nose Down
Roll Right

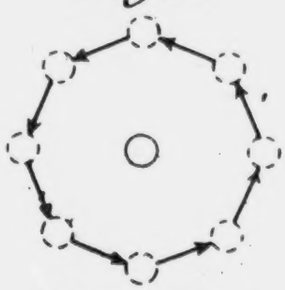
Diagrams Showing Various Possible Successive Control Movements of Joy-Stick to produce changes of plane from any attitude to any attitudes.

Fig.9.



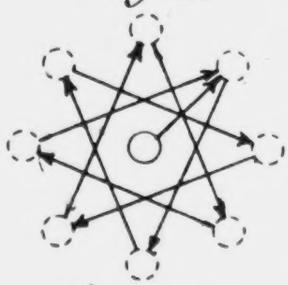
Simple or compound movements from neutral to any attitude

Fig.10.



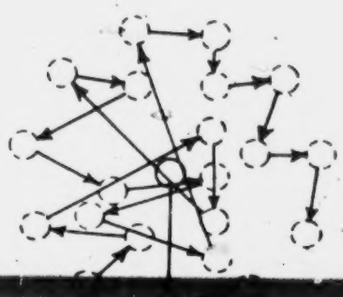
Rotary movements involving all attitudes except level keel

Fig.11.



All attitudes, crossing from one to another.

Fig.12.



Typical flying movements. Changes in control required to pursue a desired course and keep machine in balance for a few moments in gusty weather.

Each movement of stick produces a like tilting movement of plane, or opposes an opposite tilt of plane.

Such a succession of movements under the conditions named occurs in all planes, whether these be the petitioner's or the respondent's, or any other modern plane. Some of the movements are mainly premeditated maneuvering movements —such as gaining altitude, etc.; but, inextricably mixed with these are movements which the pilot is compelled to make, either for the purpose of balancing his plane or resisting unbalanced forces.

5. Even these complicated corrections which are thus simply solved by the joy-stick do not present the complete picture.

As we have previously pointed out, successful flight demands a constant state of balance of the plane. It must always be in a state of substantial equilibrium.

Every plane, however, must perform at least *some* maneuvers. These are premeditated changes in attitude of the plane from a level-keel position. Thus, every plane must move around its horizontal transverse axis to point the nose up in taking off and gaining altitude. Conversely, it must move around the same axis to nose down in descending and landing. It must bank, or roll to one side around its longitudinal axis in turning a curve. Petitioner's planes used in the Army and Navy must be put through very complicated, extreme, and hazardous maneuvers in their war evolutions.

Now, all of these maneuvers—which have to do with the attitude of the plane—are performed by the ailerons and elevator operated by the joy-stick, in precisely the same manner as equilibrium corrections. Both types are intentional, and they differ only in that in one they are performed under the stress of necessity and in the other because the pilot wishes to change the attitude of the plane to accomplish some intended purpose. In war planes, maneuvers are also frequently performed under mental stress—that is, in escaping an enemy squadron, or in diving, barrel-rolling, or the like, for gaining a favorable position for attack.

Now, in all maneuvers, as before stated, the plane must be kept in a stable attitude.

Let us assume the simple maneuver of the dive. This is accomplished by tilting the joy-stick forward.

But gusts, swirls, cross-currents, etc., *are not suspended by nature* when a pilot wishes to dive. They are just as prevalent when diving as in level flight.

In a dive, therefore, we have the pilot with his joy-stick tilted forward. Now his plane is hit by a gust or swirl, which throws it over on one side. He immediately corrects this improper attitude by tilting his joy-stick to the opposite side of the plane, without the necessity of altering his diving attitude.

The same is true of all maneuvers.

The necessity for *strict equilibrium control* is present in all maneuvers. The joy-stick superimposes on all of its movements for premeditated maneuvers, a constant stabilizing effect.

Both are indistinguishably mixed and commingled, and both are handled by the joy-stick mechanism in the simplest and most direct and effective manner.

6. Finally, but of great importance, is the lack of mental effort required by the pilot—which is of greatest value in all emergencies, of which there are many in flying.

The joy-stick, for any attitude correction, requires only the simplest mental effort. A single thought—namely, "tilt the stick towards the highest point of the plane"—or "tilt the stick the way you want the plane to tilt"—is sufficient for all corrections involving any required proportions of aileron and elevator effect.

For this simple mental effort we have coined the term "single-mindedness." A control might involve simple movements, but might require considerable antecedent thought to select in which simple direction or way it needed to be operated. Or, a control might involve a simple antecedent thought, but require a complicated mechanical movement to carry it out.

The joy-stick mechanism involves the acme of simplicity in operation in all emergencies and in antecedent mental effort.

None of the prior art structures approaches the joy-stick mechanism in either of these vital respects. All of them require two mental conceptions to keep the plane in balance or maneuver it, and many of them calculations of relative amounts of movement of the two equilibrium controls.

The Findings and Opinion of the Court of Claims.

In the ordinary case presented to this Court for review, the Court takes jurisdiction because of the fact that two different Circuit Courts of Appeal have rendered conflicting decisions as to the validity or scope of a given patent, or its infringement. In such cases the Court has before it the entire record in at least one of such cases, that one being the case in which the Court below is alleged to have erred. This Court, hence, has the opportunity of reviewing all questions of fact, passing on the competence and reliability of the witnesses, and arriving at its own findings of fact.

In a case arising in the Court of Claims, however, this Court has no such opportunity, since by Section 288 (Title 28, U. S. C.) the record below is not certified to this Court.

This Court has clearly announced from time to time, however, that in such cases the findings of fact of the Court of Claims are taken as final and conclusive (*Luckenbach* v. *United States*, 272 U. S. 533, 537).

We believe that this Court cannot fail to be impressed with the great care with which the Court of Claims examined all of the questions presented by this case. It is unusual that a patent case involving a single patent has been so exhaustively considered as the case at bar. Every point raised by the defense was examined with meticulous care, being patiently considered in all of its aspects.

The decisions of Judge Campbell and of the Circuit Court of Appeals in the *Chance Vought* case were vigorously urged at every step in the briefs and arguments and evidently very carefully considered by the Court of Claims. That the latter Court was forced by the logic of the case to its decision is apparent, among other things, from its remarks on page 61

of the record, where it states in effect that on a number of important questions in the case the record in the *Chance Vought* case must have been very different. In point of fact, it was; and, incidentally, we may suggest to this Court that as to any fact question, it can be of no moment what the Court of Appeals decided on a different record.

This case is not before this Court on appeal or other proceeding in the *Chance Vought* case. The case here for review is the suit against the United States, on the record which was present in that case. Unfortunately, under the provisions of Section 288 of the Judiciary Act, this Court cannot itself examine the long and extended record in this case, the testimony of numerous experts on the theory and practice of flying, the laws of aerodynamics, and the numerous tests which were made in wind-tunnels and in actual flight.

This is particularly a case where the well-known rule applies that the questions of validity, scope and infringement are questions of fact and not of law.

Bischoff v. *Wethered*, 76 U. S. 812-816;
Royer v. *Schulz Belting Co.*, 135 U. S. 319;
Thomson Spot Welder Co. v. *Ford Motor Co.*, 265 U. S. 445;
Stilz v. *United States*, 269 U. S. 145-147.

Having in view the fact that the case here at bar is the suit against the United States, and that the opinion on review is that of the Court of Claims: we submit, with confidence, that this Court will restrict its review to a consideration of whether or not there was error in the application of law by the Court of Claims. This Court has announced that its review of Court of Claims' cases is limited to questions of law.

Luckenbach v. *United States*, 272 U. S. 533.

Unless we are mistaken, the only pertinence of the *Chance Vought* decision is that its existence has induced this Court to examine with care the decision of the Court of Claims to ascertain whether that decision is well founded and involves any serious defect of law.

We believe that the Court will find no errors of law in the Court of Claims' decision. That Court was showered by the petitioner with alleged authorities, none of which was pertinent. Once the facts before that Court are understood, its law, it is believed, will be found impeccable. The main facts as adduced in this case are extremely simple. Many efforts have been made to provide a really effective control of the inclination or attitude of heavier-than-air machines. The proper organs were in existence, but no means had been discovered which were adequate to enable the pilot to change the attitude of the machine under the rapidly changing and hazardous conditions of flight. There were attempts all around the invention of the suit at bar. None of them was successful. The masters of the art—the Wrights, Curtiss, Langley and others—had not been able to produce the desired control. Respondent produced it in 1907 with such complete success that, like the umbrella, it has never been improved upon but is standard construction throughout the world. The petitioner's machine, as all modern machines, uses exactly the same mechanism—differing only in details. That is the sum and substance of the case. As in every important case, the petitioner has gone to great lengths in trying to anticipate it. It has invented new theories as to the lack of infringement, which would deceive no one who adequately knew the facts.

The Court of Claims perceived these salient facts and the inadequacy of the many defenses. The Court of Appeals did not; probably because of the lack of a proper record, it went completely wrong on important facts and important law.

There is but one point of law contained in the Court of Claims' opinion with which we desire to take issue—and that is, the exact status of respondent's 1906 French patent. This point is, we believe, a completely new one and is not necessary to the decision of this case if this Court follows the Court of Claims—as we believe it will—in deciding that the patent in suit covers a clear and meritorious invention over the 1906 structure when the latter is treated as the equivalent of prior art.

Petitioner's Brief.

One would suppose that the petitioner in its brief would take issue with the Court of Claims on concrete points of law. Instead of this, we find the petitioner's brief undertakes to argue the entire case *de novo*. But scant attention is paid to the findings of fact of the Court of Claims, and but little attention is paid to the rule that these fact findings are based upon a complete record not present in the *Chance Vought* case. This record comprises several thousand pages, containing the testimony of numerous experts, actual test flights, wind-tunnel tests, expositions of the laws of aerodynamics, etc.

The petitioner's brief contains numerous misstatements of fact and a wealth of misapplied citations. The most important of these will be noticed later.

There are several points appearing in the petitioner's brief which are of general application and which it would be well to notice here.

The first of these is the statement that the patent in suit is a detailed improvement upon respondent's 1906 French patent. Attempt is made to bolster this up by reference to the French law. The French law provides that a patentee shall have the sole right for a period of one year of obtaining improvement patents. Since the two French patents upon which the patent in suit is founded—namely, the second and third (Nos. 373,763 and 373,818)—were applied for within the year, the argument is that they must be for detailed improvements. This is a complete *non sequitur*. The joy-stick invention was first shown in respondent's second French patent, No. 373,763—applied for within the year after the application for respondent's 1906 patent. But it does not even mention the 1906 patent. It certainly makes no statement that it is for a detailed improvement. On petitioner's theory, any invention shown in an application, no matter how remote, must be for a detailed improvement if it is filed within the year. The Court of Appeals fell into this very obvious error in the *Chance Vought* case.

The 1906 structure was an abortive attempt to provide an adequate control. Doubtless it foreshadowed to a certain extent the invention in suit, in that it attempted to control the equilibriums with a single hand. But it did not succeed because the other hand of the pilot must be used in order to render the equilibrium control effective. This will be referred to later.

Petitioner also attempts to belittle the invention of the patent in suit and maximizes the 1906 structure on the ground that when the application for the patent in suit was first prepared and sent to the United States, it included the 1906 structure. This was afterwards stricken out. The 1906 structure was patented in France. The two 1907 structures covered by French patents Nos. 373,763 and 373,818, upon which the patent in suit is based, were certainly to related inventions. It is not uncommon that the first effort of an inventor to solve a problem is crude and impractical. And it is not uncommon practice, both here and abroad, to file applications which include a series of related inventions. If a claim can be obtained in this country broad enough to include them all, well and good. This was evidently the respondent's idea in preparing his first application. The 1906 structure was so imperfect that it was never built, either at the time or at any time thereafter. But, as before stated, it had the germ of an idea and it was proper enough to cover it in this country. In this respondent failed because of the delay in transmittal of the application papers. Respondent's inventions of the second and third applications in France turned the failure of his first application into complete success. The papers were revised and filed in the United States Patent Office. There is nothing mysterious about these circumstances, nor do they in any way minimize the importance of the invention at bar.

Petitioner also complains that, if the invention in suit was so immeasurably superior to the 1906 structure, it was strange that it was produced within a month after the 1906 structure. Of course, such arguments mean nothing. An invention is not measured by the duration of the period taken to produce it.

Summary of Pertinent Facts as Found by the Court of Claims, Which Are Not Subject to Review.

When these facts, which must be accepted as true in this case, are analyzed, it will be found, we submit, that they negative every fact contention of the petitioner and leave to this Court only the duty of ascertaining whether the law invoked by the Court of Claims is good or bad.

The salient facts found are as follows:

1. Respondent's 1906 French patent, No. 372,753, is a two-handed structure, being inoperative if either hand is released. For longitudinal equilibrium control, the plane assumes an inclination opposite to the inclination of the right-hand lever. The right- and left-hand levers are interconnected, so that it is essential that the pilot continuously keep hold of both levers (Finding IV, Rec. pp. 7-8).

2. The specification of the patent in suit as filed showed the invention in suit in substantially the same manner as it appears in the patent as granted (Finding VII, Rec. p. 10).

3. The specification and drawings to which the original claims made reference disclose vertical levers for steering and for equilibrium control which operated exactly as those described in the patent in suit as granted (Finding VIII, Rec. pp. 11-12).

4. Original claim 4 as filed was directed to separate levers for controlling the distortable wings and both rudders (Finding VIII, Rec. pp. 11-12).

5. Claim 2 of the patent in suit is the same as claim 2 of the amendment filed on February 1, 1909 (Findings VIII and IX, Rec. pp. 12-13, giving the claim in full).

6. Lateral equilibrium or attitude control rolls the plane around its longitudinal axis; longitudinal equilibrium or attitude control inclines the plane either downward or upward, as in descending or ascending. Rolling caused by lateral control not only regains lost stability but banks the plane (Finding X, Rec. pp. 14-15).

7. It frequently occurs that both longitudinal and lateral equilibriums are simultaneously disturbed and a simultaneous correction is required, in the majority of instances, of equilibrium or attitude control (Finding X, Rec. p. 15).

8. An airplane may be constructed with a certain amount of transverse and lateral stability inherent in its structure. The banking and elevational controls with such machines have a superimposed stabilizing tendency upon the plane and are used by the pilot for this purpose. The banking and elevational controls function respectively as lateral and longitudinal equilibrium controls (Finding XI, Rec. pp. 15-16).

9. Man has an instinctive balancing sense; and an equilibrium control comprising a vertical lever universally mounted to incline in any direction and which, when thus inclined in any vertical plane, causes a corresponding movement of the whole airplane, tends to eliminate a material part of the conscious mental effort of the pilot with respect to equilibrium control (Finding XII, Rec. pp. 16-17).

10. The disclosures and description contained in the patent in suit are of sufficient fullness to enable one skilled in the art to practice the invention disclosed by the patent in suit and defined by the phraseology of the claims (Finding XIII, Rec. pp. 17-19).

11. In the bird-tail structure, any cross responses do not impair the operativeness of either the right- or left-hand lever and each lever performs its function regardless of the position of the other lever (Finding XIV, Rec. p. 19).

12. In the ring-tail structure, cross responses do not impair the operativeness of either the right-hand or left-hand control lever and each lever performs its function regardless of the position of the other lever (Finding XV, Rec. pp. 19-20).

13. The ring-tail structure is operative in actual flight: the steering and stabilizing levers are mechanically separate and independent, and each lever performs its function regardless of the manipulation of the other lever (Finding XVII, Rec. p. 21).

14. Minor cross responses are present in all airplane controls (Finding XVIII, Rec. p. 21).

15. The control systems of the Curtiss, DeHaviland, and Loening airplanes complained of have means for controlling the transverse and longitudinal equilibriums, or pitch and roll of the airplane, comprising a vertical lever universally mounted at its lower end which operates the ailerons and elevator. The operation is such that when the lever is pushed forward, these airplanes nose down; when it is moved backward, the airplanes move up; when it is moved to the right, the airplane rolls to the right; and when it is moved to the left, the airplane rolls to the left. When the lever is moved in any intermediate position, the movement of the airplane produced corresponds to the degree of inclination and direction of movement of the lever (Finding XXI, Rec. pp. 22-24).

16. Each of these three planes has wings, a portion of which is hinged so that the contour of the wing surface may be altered and the angle of attack changed for the purpose of controlling the roll or transverse equilibrium. Each has a rudder pivoted on a horizontal axis for controlling the longitudinal equilibrium or pitch. Each has a universally-mounted vertical lever for operating it, and the inclination of this lever is followed by a similar inclination of the plane. The responses of the plane accord with the instinctive balancing sensations of the pilot. The steering rudder is operated by a separate lever.

The equilibrium control lever of the three airplanes has the same controlling functions as the equilibrium control lever of the patent in suit (Finding XXII, Rec. pp. 24-25).

17. The prior art patents show structures which lack the characteristic construction and operation of the patent in suit, as follows:

Penaud & Gauchot (Finding XXV, Rec. p. 26)—No transverse equilibrium; lever for elevator, handle-bar for steering;

Davidson (Finding XXVI, Rec. p. 26)—No manual control, and construction inoperative;

Macedo (Finding XXVII, Rec. p. 27)—Longitudinal control a foot lever; transverse control and steering by a fore-and-aft lever having a steering handle-bar at the top; foot and two hands necessary for equilibrium control;

Laroze (Finding XXVIII, Rec. p. 28)—Longitudinal equilibrium by pivoted column; lateral equilibrium by handle-bar movement of wheel; steering by rotation of wheel; two-handed control of equilibrium;

Schüssler (Finding XXIX, Rec. p. 29)—No equilibrium controls;

Jung (Finding XXX, Rec. p. 29)—Dependent swinging lever for elevator; no transverse equilibrium control; no steering;

Wright (Finding XXXI, Rec. p. 30)—Body cradle for lateral control inseparately fixed to steering; movable roller for elevator;

Wadsworth (Finding XXXII, Rec. p. 30)—Universal vertical lever for actuating one mechanism by one movement and a second mechanism by a movement at right angles to the first; no mention of aviation or equilibrium control of an airplane;

Weeber (Finding XXXIII, Rec. p. 30)—Universally-mounted lever for controlling steering and braking device for automobiles; no mention of use in connection with equilibrium controls of an airplane;

Hartness (Finding XXXIV, Rec. p. 30)—Boat attachment for balloons; horizontal universal lever for steering rudder and elevator;

Quentin (Finding XXXV, Rec. p. 31)—No control of longitudinal or lateral stability;

Wilson (Finding XXXVI, Rec. p. 31)—Horizontal universal lever for electrical circuits; and

Simpson (Finding XXXVII, Rec. pp. 31-32)—Hydroplane boat with universal vertical lever and wheel connected with hydroplane surface for changing posture of boat; pilot winds up wheel to emerge boat, and tilts lever to control incidence of the hydroplane.

18. Bleriot and Farman planes were brought to this country in 1910 and 1911 for exhibition flights. Some airplanes were built in this country. These several planes employed the characteristic joy-stick construction and mode of operation. None was in the United States when the application for the patent in suit did not contain either claim 12 of February 1, 1909, or claim 13 of February 1, 1909, or the claims in suit (Finding XXXVIII, Rec. p. 32).

19. Two types of planes were in use in the United States in 1912: Wright and Curtiss. The lateral control of Wright was a fore-and-aft lever; the longitudinal control, a fore-and-aft lever; steering, small tilting lever on lateral control. The lateral control of Curtiss was a shoulder yoke; the longitudinal control, a fore-and-aft lever; steering, by a wheel on the longitudinal lever (Finding XXXIX, Rec. p. 33).

20. The Ferber booklets contain no disclosure of the invention in suit (Finding XL, Rec. p. 33).

21. Ferber's experiments in France: Steering and lateral controls by single airfoil surfaces (Finding XLI, Rec. p. 34).

22. The Vautrin sketch relates solely to elevational and directional rudder; no lateral equilibrium control. The phrase "in prior legitimate and personal possession of the invention" means secret possession or knowledge legitimately obtained of a patented invention prior to the application for patent (Findings XLII to XLVI, Rec. pp. 35-37).

23. Control of airplanes having the construction and mode of operation of the patent in suit was widely adopted in France and in the United States. It was generally used in the United States in all but heavier types of machines, which, because of their comparative size and weight, require a greater controlling force than can be conveniently applied by the pilot to a simple vertical lever. This control system is the most satisfactory control ever had from the standpoint of training and from the standpoint of minimum amount of attention required (Finding XLVII, Rec. pp. 37-38).

I.

Argument.

We think it will assist the Court in a study of this case if we adopt the same order that the petitioner has adopted in a discussion of the various questions presented in so far as this may be possible.

With this in view, we will use numbers and titles corresponding to those of petitioner's brief.

In the previous pages of the present brief we have pointed out the extraordinary hazards of aviation, the complicated conditions under which an airplane flies at all, and the way that the problems of control of equilibrium were solved by the invention in suit.

The problems of heavier-than-air flight are unique. Nothing approaching them exists in any other art. The problems would be complicated enough if it were merely a case of a body floating in space and subjected to movements in all three dimensions, such movements not only relating to balance but also to bodily movements of the plane. An airplane has all these, and much more. It can only keep aloft, as we have before pointed out, by high speed. Reducing this speed below a minimum high velocity causes a collapse of the entire phenomenon of flight. If the airplane gets badly out of balance, the same thing occurs.

It is very obvious, therefore, that there is no other art which is analogous to it. What can be learned from one art would aid the aviator not at all in any problem involving the phenomenon of flight. Of course, a screw will hold a block in an airplane, or on a wall, or on a piece of furniture. A lever will move another device of an airplane as a mechanical proposition; a cleat will hold a cord, and so on.

Other mechanical contrivances are known of general application.

But these have nothing to do with the phenomenon of flight and the great problems which had to be solved in making flight successful.

When petitioner, therefore, argues about patents of the type of Wadsworth, Weeber, and the like, it is relying upon devices in arts which are in all senses of the word alien.

None of them apparently made any impress upon its own art, or came into practical use.

The Court of Appeals can scarcely be said to have looked upon the patent in suit with a favorable eye, but even that Court excluded all art which was outside of the art of aviation. As to this point the Court of Appeals and the Court of Claims are precisely in accord. There is no conflict, and, as we take it, this Court will not review such a question of fact where the lower courts do not differ (*Thomson Spot Welder Co.* v. *Ford Motor Co.*, 265 U. S. 445).

Even Judge Campbell excluded the patent to Essberger & Geyer for an electrical apparatus for controlling cranes (56 Fed. [2d] 393, at 399). Judge Campbell did include the patent to Weeber, which is present in this case, and the patent to Glazier, both of which related to motor vehicles (same page); but Judge Campbell's reason for doing this is curious. He states that both employ combustion engines, and that motor cars—

> "* * * as do aeroplanes, in taking off and landing, move on the ground."

In other words, Judge Campbell admits as analogous art a motor vehicle control because an airplane, *when it is not acting as an airplane at all,* moves on the ground. What the taxiing of an airplane has to do with the phenomenon of flight is not explained by the Court. How the control of a brake or what-not in a motor car bears any resemblance to the totally different problem of maintaining the equilibrium of an airplane is not disclosed (see op. Rec. p. 65).

With these preliminary remarks we will pass to a short discussion of the prior patents.

A.

Prior Patents.

The petitioner argues that the United States patent to Wadsworth, No. 213-079, of March 11, 1879, discloses a single vertical lever mounted on a universal joint for operating two devices and anticipates the invention in suit. This is because Wadsworth states that it is his object to control through one lever or handle the simultaneous or independent action of engines or mechanisms so that they may be worked singly, together, or in opposition (Wadsworth Patent, Defendant's Exhibit D-112, lines 10-14). The petitioner states that, thus, the invention is a generic one and is not limited or restricted to a specific art, and cites certain cases which are not in point in support of its argument.

If this reasoning were followed, it would go far to negative some of our most important inventions. Levers, cams, cogs, and many other mechanical devices are all old, and yet there is rarely a mechanical patent which does not employ one or more of them.

The plain answer to petitioner's argument is: Why should anyone use the Wadsworth lever for the control of airplanes? Who knew or appreciated that it was of any utility? The recognized masters of the art of flying—such as Wright, Curtiss, Langley and others—gained absolutely nothing from Wadsworth, whose patent was taken out in 1879. The Wrights in their epoch-making flight at Kitty Hawk used a construction which formed their basic patent, No. 821,393, and this structure did not have a lever of any kind or description in the whole airplane. Curtiss used a lever for his elevator and a shoulder-yoke for his ailerons. The Wrights later used an elevator lever with a steering lever on top of it. None of these masters had the gist of respondent's invention—which was that, of all conceivable methods of control, the combination of the two equilibrium controls in a single hand operated by a vertical lever, the movements of which were indexed by the position of the plane, was the only control which would adequately take care of the extreme hazards of flight.

Wadsworth contributed precisely nothing to this.

But, still more: Wadsworth's suggestion was to operate two unlike mechanisms for mere convenience.

Respondent's conception was to take the ailerons and the elevator which have effective operations at right angles to each other, and produce from these two organs what was *in effect a single organ having operative effect entirely around the airplane* so as to balance the plane against disturbances in attitude from every direction by a simple movement in the direction in which it was necessary to tilt the plane for correction.

This conception was so immeasurably beyond anything which Wadsworth had in mind or disclosed that, even if the Wadsworth patent could be tortured into an analogous art, it would still completely fail to anticipate the novel ideas involved in the invention at bar.

Petitioner is simply doing the old, old thing of taking a brilliant conception, picking apart its mechanism, and finding similar mechanisms in other arts. There are almost no inventions that cannot be similarly dissected. The vice of it is that such a dissector must first have the invention in order to tell him what parts he must look for among prior patents and then how to use such parts.

This Court has so many times refused to follow such reasoning that it is scarcely worth while to cite decisions.

The same reasoning applies to Weeber, Wilson and Simpson. The Simpson structure in addition has essentially a two-handed control. If one hand is used on Simpson's wheel to control the longitudinal or lateral posture of the boat, it invariably will produce a lateral or longitudinal change as well. Simpson's column is not a true lever since its operating part, the wheel, has no fixed fulcrum. Simpson has much the same vices as Laroze (op. Rec. p. 64).

There is one point in petitioner's discussion that deserves an answer (Petitioner's Brief, p. 25): this is the statement that none of the patents here discussed was cited by the Examiner during the pendency of the application in the Patent Office and that this circumstance enhances their importance as anticipatory references.

The fact happens to be that the Patent Office had before it a patent in the art of aviation which—while it did not apply to heavier-than-air machines, and hence did not attempt to solve any of the equilibrium problems of heavier-than-air flight—still might be said to be in a much more analogous art than any of the patents we have discussed. That was the patent to Hartness, No. 168,486, of October 5, 1875, which related to a car or boat attachment for balloons. It showed a universal lever at the rear of the balloon car, this lever operating an elevator and a steering rudder. It is discussed in Finding XXXIV (Rec. p. 30). This patent was discarded by the Patent Office, presumably for the very obvious reason that it did not disclose the invention in suit; this latter does not put the steering and elevator in one hand, but the *elevator and ailerons*. Unless these two equilibriums are under the control of one hand, the invention is not realized.

Laroze (Defendant's Exhibit D-6). On page 26 of petitioner's brief it is stated that this patent is a direct anticipation, "for it discloses a single vertical lever which by its various movements controls the lateral and longitudinal equilibrium of an airplane." This patent is considered in Finding XXVIII, which shows that the petitioner's statement is obviously in error. The frailty of this Laroze control, its hopelessly confusing nature, and its lack of value in comparison with the joy-stick are so forcibly set forth in the Court of Claims' opinion (Rec. p. 62) that we can add but little to the Court's remarks. It is distinctly and inevitably a two-handed control, requiring both hands for any equilibrium movements. So far as the equilibriums are concerned, the Laroze control does not consist of a single lever universally mounted. It consists of a simple lever with a handle-bar at the top, since Laroze's wheel controls the transverse equilibrium by a handle-bar movement. It would take a daring pilot indeed to navigate a plane equipped with the Laroze control. Laroze was cited and withdrawn by the Patent Office.

Wright (Plaintiff's Exhibit 50, discussed in Finding XXXI, Rec. p. 30). As the first persons to ever make mechanical flight, the Wright brothers are entitled to all the

encomiums which can be showered upon them. But, as inventors of an adequate equilibrium control, we have only to say that they themselves speedily discarded their own structures as set forth in their basic patent, No. 821,393. In that patent the Wrights explained that when a wing is warped to correct a transverse tilt, it produces a drag, which causes the other side of the plane to move more rapidly and, hence, turn the airplane in a steering sense. To offset this, they fixedly connected their warping wing control with the steering rudder, so that they must be operated together. Steering without warping is impossible, and warping without steering is impossible. The mechanism for producing this effect was a sliding cradle upon which the pilot lay prone, shifting his body from one side to the other. The elevator was operated by a completely separate mechanism, comprising a roller which was twisted by the two hands of the pilot as he reposed upon the cradle. Of this the Court of Claims correctly states:

> "If the ingenuity of scientists in this art had exhausted itself in the control mechanism of the Wright patent, it is not exaggeration to state, but clearly observable, that the modern airplane would never have been developed. We think we may with confidence assert that there is not a single airplane patent cited as prior art that does not embody attempts to not only simplify a control mechanism, but concerted efforts to create one capable of functioning efficiently, and following the demonstration of the possibility of flight by the Wright brothers, inventors turned their attention to this important feature of airplane control" (p. 58).

Penaud & Gauchot, French Patent No. 111,574. In this structure there is no control of transverse equilibrium whatever. It had a dihedral arrangement of its wings. Its steering and longitudinal equilibrium controls were united in a single device, both hands being required either for longitudinal equilibrium or steering. There is no disclosure of the direction of the response of the longitudinal equilibrium control (Finding XXV, Rec. p. 26).

Davidson, British Patent No. 13,700 of 1898. This patent shows an attempt at an automatic control, using a pendulum for this purpose. It has nothing in common with the joy-stick, and is inoperative because of the disturbing effects of inertial and centrifugal forces. The idea of stabilizing an airplane by automatic mechanism has always been an attractive one, but never until a very recent date has any progress been made along this line. We understand that there is now on the market a device of this type, but that it is not capable of stabilizing the plane in taking off, landing, or near the ground—being useful, however, on long flights at high altitude to relieve the pilot (Finding XXVI, Rec. pp. 26-27).

Macedo, French Patent No. 290,488. In this device the longitudinal equilibrium control is operated by a foot lever, the movement of which produces an opposite response to that of the joy-stick. The transverse equilibrium control is united with the steering control, and the response of the plane is at right angles to the movement of the transverse control (Finding XXVII, Rec. pp. 27-28).

Schüssler, German Patent No. 85,326. This structure has no equilibrium control, being a depending rod used for steering (Finding XXIX, Rec. p. 29).

Jung, German Patent No. 129,146. This patent has no means for controlling transverse equilibrium and no steering means (Finding XXX, Rec. p. 29).

Hartness, U. S. Patent No. 168,486. This patent relates to a car or basket for a balloon. It has an integral elevational and steering rudder mounted on a single lever, which is in turn mounted on a universal joint. The responses of the car are opposite to those of the joy-stick. There are no lateral stabilizing means (Finding XXXIV, Rec. pp. 30-31).

Quentin, British Patent No. 3,872 of 1892. This structure has no means for producing or controlling longitudinal stability and no means for producing or controlling lateral stability (Finding XXXV, Rec. p. 31).

Respondent's 1906 Patent. Assuming that this patent is prior art, it shows a construction in which two horizontal

levers are employed to rotate the entire wings of an airplane. For all longitudinal equilibriums, or equilibriums in which there is a longitudinal component, which comprise a great majority of equilibrium movements, the right-hand lever is dependent upon the left-hand lever for its movements. If the left-hand lever is released, the right-hand lever is inoperative. The pivoted wings are released from control, and the whole plane becomes out of control. The structure, hence, requires the constant use of both hands and two mental operations. It entirely lacks the self-indicating operation of the patent in suit; the plane does not follow the tilt of the stick, and the operation is not such as to take advantage of instinctive balancing as to its longitudinal equilibrium.

This sums up a discussion of the prior art structures. In none of them is there (1) a single-handed control of both equilibriums; (2) a plane which as to all of its equilibriums follows the tilt of the stick; (3) a plane in which its attitude constitutes an index or indicator towards which the control lever can be moved in a simple, direct way to make any necessary correction; or (4) a plane in which the corrective movements of the equilibrium control accord with the instinctive movements of the pilot.

The effect of this prior art upon the airplane industry in the United States was practically *nil*. Prior to the time when respondent's invention was introduced into the United States, we find that the Wright brothers changed to a control in which there were two single levers mounted adjacent the pilot's seat, one of which moved forward and aft for lateral control and had on its top a small tilting lever swinging right and left for steering. The left-hand lever controlled the elevation and depression. This Wright control was one of the standard controls in the United States in 1912. It was not prior art. Here the Wrights, while *mechanically* separating steering from lateral or transverse control, still continued to put them under one hand of the pilot (see Finding XXXIX, Rec. p. 33).

The Curtiss control, which constituted the other standard control of 1912, consisted of a shoulder-yoke mounted on the

back of the pilot's seat and strapped to the pilot's body. A simple lever moving fore and aft controlled the elevator, and steering was accomplished by a wheel mounted on the top of the lever. This Curtiss control was a much later development than the invention in suit (Finding XXXIX, Rec. p. 33).

When all is said and done, the actual effect of all prior patents upon the practical and commercial art up to 1912 was represented by these two controls. If there had been any possibility that Wadsworth, Weeber, Laroze and others could have pointed the way toward a practical control, it should have appeared in these two standard controls of Wright and Curtiss.

In neither were the two equilibriums under the control of a single, universal lever. In both the steering was associated with one of the equilibriums.

Both of these controls were discarded when the United States entered the war and sent its aviators abroad, where the joy-stick control was in practically universal use.

When the petitioner argues that there were only three controls and a small number of possibilities as to combination, and that it required no invention to produce the invention in suit, it is flying in the face of actual practical experience of the commercial art developed by the acknowledged leaders in aviation.

The fact of the matter is that there were dozens of possible ways to control an airplane as to equilibrium. There were levers, slides, wheels, handle-bars, cylinders—all of which had been used. The ideal control might have been any one of these (or it might have involved none of them), combined in any one of a number of different ways with the various control organs.

We are referring to this especially, since the Court of Appeals fell into the same error as petitioner. Once the respondent discovered the perfect control, as we have before stated, it becomes very easy to analyze it, dissect it, and find its parts in the art.

This art is peculiar—in that, while the Wrights did not fly until 1902, about every principle of flight had been referred to in prior literature and patents. The petitioner refers to the patent to Penaud & Gauchot, which was an astonishing production for its day (1876). Inventors had long known that they had to control equilibrium to obtain successful flight, and had provided many types of mechanism for such control. Nearly every problem had been worked out prior to the actual fulfilment of the desire for mechanical flight, except the problem solved by respondent.

B.

PRIOR PATENTS NOT IN ANALOGOUS ARTS.

On page 34, petitioner's brief, petitioner under the heading "The Prior Patents Are in Analogous Arts" discusses those patents of the Wadsworth type which both the Court of Claims and the Court of Appeals discarded.

We have already discussed much of this ground beginning at page 31 of this brief.

Petitioner, however, attempts to point out some analogies with the idea of rebutting what appears to be the unanimous opinion of the Court of Claims and the Court of Appeals. But none of the analogies referred to has any bearing upon the case at bar.

We scarcely need to refer this Court to its own many decisions with regard to analogous arts. The latest of these is, we believe, *Powers-Kennedy Contracting Corporation* v. *Concrete Company*, 282 U. S. 175. In that case the patents upheld as prior art all dealt in the handling of similar material.

The distinguishing feature of the case at bar is that there was a crying need for a simple, direct, self-indicating, instinctive control for the stabilizing organs of an airplane. No one had any idea whether such a control would ever be found, or, if found, what it would be like, or what it would involve. The best minds in the art were puzzled by the problem and advanced solutions which were immediately discarded when respondent's invention became known. The

problems were unique and the solution of them depended upon the discovery of how they could be solved. Here was no case of pushing an airplane by a propeller when a boat has already been pushed by a propeller. Nor was it a case of using the same mixing device for concrete that had already been used to mix tea or grout or other substances. We will not weary the Court by a detailed analysis of the profusion of cases cited on page 75 of petitioner's brief. None of them is in point in the case at bar.

C.

The Respondent's Device Involves Invention of High Order.

On page 36 of petitioner's brief, under the title "The Device Does Not Rise to the Dignity of an Invention," petitioner repeats much of the same argument that we have already considered.

Again petitioner cites many decisions which are not in point.

These considerations were all urged upon the Court of Claims and many of the decisions cited. The latter Court discarded them as not applicable.

We have already answered in most part the contentions of petitioner under this heading. They are essentially grounded upon bad law.

The aviation industry is not only a very important industry commercially, but it is a vital arm of defense to this country. The government is by far the largest user of airplanes in the United States.

No user is more dependent upon and has reaped so much advantage from respondent's invention as the government.

The salvation of the government airplane service as an arm of defense is to a very large degree dependent upon the the use of the joy-stick. In combat the maneuvers for machine gunfire, etc., are extremely rapid and complex, and necessarily so. The planes are repeatedly thrown into positions of great danger from the standpoint of equilibrium. In fact,

every facility of the airplane is strained to its utmost in combat and scout flying.

The extraordinary ease of control of an airplane for all purposes by the joy-stick is of tremendous value. The pilot has almost constant use for one of his hands outside of the equilibrium control. He is in constant danger both on account of his rapid and complex maneuvers and stabilizing and on account of the danger of enemy fire. The joy-stick control is so simple, direct, positive and instinctive that it calls for the very minimum of mental operation or conscious thought.

Contrast this, for instance, with the best control that Wright produced or Curtiss or Laroze with the complications and necessity for two-handed control of equilibrium and the value of respondent's invention is apparent.

The fact that the joy-stick has been adopted throughout the world as the standard control is but another evidence of its value.

To say that this involved no invention over the two-handed failures of the prior art, which required two mental operations for every equilibrium or maneuver control, is an insult to the intelligence.

D.

The Instinctive Character of the Joy-Stick Control.

Starting with page 38 of petitioner's brief, under the title "There Is No Merit in the Contention that the Element of Invention Is Found in the Alleged Instinctive Character of the Operation of the Control Lever," petitioner has devoted many pages to a discussion largely composed of erroneous statements of fact and law.

The Court of Claims has found as a fact that instinctiveness in a control is of value, and eliminates a material part of the mental effort required in operating it (Finding XII, Rec. p. 16; op. Rec. pp. 50-51).

In order that this Court may understand this particular question clearly, we state respondent's position as follows:

1. Respondent is the first in the art to produce a mechanism in which the entire control of equilibrium of the plane is in one hand of the pilot, so that a single mental operation and a single muscular response are all that is necessary in its operation.

2. Respondent is the first to provide such a mechanism with a single lever as the manual operating part which the pilot grasps.

3. Respondent is the first to arrange such a lever vertically so that the tilt of the plane in all of its attitudes constitutes a true indication or index of the proper corrective movement of the vertical lever, either to compensate for an unbalanced attitude or to make a premeditated maneuver.

4. Respondent is the first to completely divorce the steering function from the one-handed control of the equilibrium.

5. Respondent is the first to produce an equilibrium control, all of the corrective movements of which are in consonance with the reflex balancing movements of the pilot so that all corrective movements are aided and not hindered by such reflex balancing movements.

The so-called instinctiveness of respondent's control is due to the same combination of responses that make possible the mode of operation by which the plane follows the tilt of the stick.

That is to say, in respondent's single lever stability control of inclination the mechanism so operates that when the stick is tilted forwardly the nose of the plane tilts downwardly; when the stick is tilted rearwardly the nose of the plane is tilted upwardly; when the stick is tilted to the left the plane is tilted to the left; and when the stick is tilted fo the right the plane is tilted to the right. *This mode of operation is in consonance with the balancing movements of the pilot.*

As elsewhere indicated, human beings learn early in life to balance themselves on their feet and unconsciously lean in the opposite direction to any force which tends to unbalance them. The Court, of course, is aware of the fact that on a vessel rolling to the right, a passenger unconsciously and automatically leans to the left. This balancing instinct is quite as effective when sitting down as when standing. Note the leaning forward of a rider when his horse rears and the leaning forward of the occupant of a rocking-chair when it is tilted backward. The same is true of tilts in all directions; the person tilted invariably moves to maintain the vertical condition of his body.

The pilot of an airplane which is suddenly tilted in any direction tends to lean away from the lowest point of the plane and toward the highest point. In other words, he tends to keep his body upright or vertical. This tendency coincides precisely with the corrective movements of the joy-stick, which are necessary to compensate for a disturbed attitude of the plane.

Respondent has never contended that the joy-stick, because of this instinctive operation, enables a blind man to fly or permits a pilot entirely to forget the control of the machine.

Respondent has contended, and justly so, that the instinctive quality of the joy-stick in its best form is always of value to the pilot. This is so, first, because he does not have to make corrective movements to the right while he is instinctively leaning to the left, or forward while he is instinctively leaning backward. Second, because if the pilot maintains his hold upon the joy-stick, his instinctive movements, whether he thinks or not, carry the joy-stick with him and tend to right the plane rather than tend to unbalance it further.

Claim 8 of the patent in suit is for a combination having a mode of operation from which result these instinctive characteristics. The joy-stick could be produced without this distinctive mode of operation. It would still be vastly superior to any other equilibrium control. But the mode of operation covered by claim 8 supplies that last degree of

superiority which leaves nothing to be desired in the way of manual control.

Claim 7 is more functional in its character and is directed to operation of the joy-stick by reflex movements of the pilot. But claim 7, while somewhat functional in this respect, is patentable over the prior art in the same way that claim 5 is patentable. It contains the limitations of the single vertical universally mounted lever associated with the control organs which distinguish this invention from all others. Claim 7 is not necessary to the protection of this invention. It could have been cancelled from the patent without lessening the protection. We repeat, the instinctive operation follows from the combination of claim 8.

With this explanation much, if not all, of petitioner's argument falls by the wayside. The combination of claim 8 is a novel combination from any angle. Prior to respondent's invention there never had been a control of equilibrium of any kind, whether levers, handle-bars, wheels or otherwise, which was wholly instinctive in its characteristics. This is an important advantage of the particular structure of claim 8.

Petitioner states that the lever can be connected in various ways and argues that instinctiveness does not result from the control lever, but from the arrangements of linkages. It is not a universal lever that is protected by the claims. It is the combination between the control organs and the universal lever which comprises the invention, and the particular combination of claim 8 has the virtues above described.

Petitioner, hence, goes far afield when he calls this a process. It is a mechanism pure and simple, and it is a mechanism which has certain important advantages among which is its instinctive mode of operation.

Again, petitioner cites many cases which are not in the least in point.

Petitioner states that the instinctive character of the mechanism cannot be used to support the invention and that the operation of the control of claim 8 is not sufficient to constitute an invention. This is the first time that we have

heard seriously advanced the theory that if a mechanism is so constructed and operates that it saves life and limb by taking advantage of instinctive reactions it is not of sufficient importance to constitute invention. Perhaps if petitioner's counsel had to undergo the hazards of the army or navy pilot he would think it was of supreme importance to be able to control his ship, under the stress of combat, for instance, with as little thought as the instinctive character of the joy-stick permits.

In a note at the bottom of page 43 petitioner gives certain illustrations of what it calls non-instinctive or contra-instinctive control movements in sailboats and automobiles. But the various illustrations the petitioner gives refer to very simple movements in a single plane. The contra-instinctive movements of the tiller of a sailboat are due to an age-old design of rudder and tiller. In all automobiles the steering-wheel turns in the direction that the automobile turns. Such simple movements can be easily learned, but when it comes to the equilibrium of an airplane which demands, as we have shown at the beginning of this brief, an infinity of different movements with an infinity of different proportions of elevator and aileron control, and which also demands exceedingly quick thinking and manual action, and produces dire results if the thought or action is not quick and correct, instinctiveness is of great value.

If anyone before the respondent ever thought of an instinctive control, he must have discarded it for the reason that he agreed with petitioner's counsel in his idea of its value. The Court of Claims finds otherwise (Finding XII, Rec. p. 16).

But this significant fact still remains:

Not only the United States Government, but all airplane manufacturers in the United States and elsewhere, have been using the joy-stick control for twenty years, practically to the exclusion of all other controls. *In not a single instance has the government or the United States manufacturers used any other combination than the instinctive combination.*

According to petitioner's present stand, it was a matter of indifference what the mode of operation was. One mode

is just as good as another. If this were true, one would certainly look for a considerable diversity of modes of operation among our many manufacturers and the government itself. There has been none.

This is an excellent illustration of the remark of one of our prominent patent judges, to the effect that the defendant pays lip service to other constructions but the tribute of *imitation* to the patented device.

Evidently feeling that this was the fact, petitioner attacked the instinctive quality of the respondent's best form set forth in claim 8 by attempting to show that the patent itself illustrated and described instinctive and contra-instinctive controls and that the specification did not say which was preferred or refer specifically to the instinctive combination.

It is a fact that the specification does not specifically say that the construction of claim 8 is instinctive, or mention the advantages of the instinctive mode of operation.

But the construction from which instinctive operation flows has always been shown in the patent and described in detail. It is claimed in claims 7 and 8, and nothing more is necessary under the law.

Petitioner attempts to uphold its position by a statement that Fig. 7ª of the patent in suit shows opposite responses in longitudinal equilibrium. This would be entirely immaterial even if true, since respondent described and claimed the preferred responses in claim 8. On Rec. page 52, however, it is shown that Fig. 7ª was a mere draftsman's error in one of the group of views illustrating the bird-tail structure, the other views showing the instinctive responses of claim 8.

The petitioner complains that claim 8 was not introduced into the application until June 12, 1913, and that in the meantime the joy-stick had been adopted by the industry on a large scale. In passing, this adoption by the industry on a large scale consisted of a few planes imported by Bleriot and Farman and a few planes manufactured here (see Finding XXXVIII). But the application for the patent in suit always had shown and described the combination of

claim 8 and contained claims which included its construction and covered structures having all of the virtues of claim 8.

While the specification does not mention instinctiveness in so many words, it describes at great length the construction and mode of operation from which instinctiveness flows.

Permutit Company v. *Graver Corporation*, 284 U. S. 52, is obviously not in point. In that case, which related to a water filter, the claims were met by the prior art, as held by this Court. The plaintiff tried to induce this Court to read into the claims a certain chamber which was shown in the drawing, but not even mentioned in the specification or claims, and thereby to transmute invalid claims into valid claims. This would obviously have validated the claims by inclusion of a feature not described or claimed.

The opposite is true in the case at bar. The construction was adequately described and adequately shown from the beginning. All that was omitted was a statement that the construction had the advantage of instinctiveness.

When the patent issued, claims 7 and 8, which involve instinctiveness, were included in the patent. No better way is known to our law to point out the preferred construction than to claim it. Obviously *Permutit* v. *Graver* does not apply.

II.

The patent in suit should not be limited to the ring-tail and bird-tail constructions shown.

On page 47 of petitioner's brief under the title "The Patent, If Valid, Should Be Construed As Limited to a Combination Comprising a Pair of Vertical Control Levers with a Single Integral or Unitary Tail Surface of an Airplane," the petitioner argues that this should be done.

It would be sufficient to say that not the slightest reason is shown in the prior art or other defenses why such a complete emasculating of the patent should be done. On the contrary, there is every reason why it should not be.

1. None of the claims in suit is in any way limited as to the specific tail structures illustrated for inclining the plane around its major axes. Claim 2 provides for "distortable wings for maintaining transverse stability" and a "rudder (horizontal) for maintaining longitudinal stability." Any form of distortable wings (warping, ailerons, etc.) satisfies the first requirement, and any form of rudder (elevator, at the tail or elsewhere as in Wright's machine) satisfies the second.

Claims 5 and 9 require only some satisfactory means for producing lateral stability, and some satisfactory means for producing longitudinal stability. Doubtless such means should be airfoil surfaces adapted for increased or decreased incidence. No other has been found.

In both claim 2 and claims 5 to 9, the distortable wings and elevator are only parts of the combination, which includes the lever connected to both said means for operating them, and in claims 5 to 9 the lever must be a single vertical universally mounted lever.

2. Where is this device so described shown in the art?

Is it in Laroze? Laroze is a two-handed, two-minded structure, and even if operated by two hands, is hopelessly confusing for the intricate and delicate task it has to perform.

Is it respondent's 1906 structure? This structure, while not as hopeless as Laroze, still requires always the use of two hands for *equilibrium*. Let one lever go, and the plane goes into a spin at once, for all control of the longitudinal equilibrium vanishes. The construction and operation of the 1906 patent are fully discussed in the pages immediately following.

Is it in Wright? With the stomach cradle and the lateral equilibrium fixedly connected with the steering? And the elevator operated by a hand roll?*

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* The early Wright experiments demonstrating the possibility of heavier-than-air flight were epoch-making, but they were performed in the calmest possible weather. For several years after, in exhibition flights, no Wright pilot would take up a plane if there was air enough stirring to move a handkerchief. The Wrights themselves soon saw the impracticability of their control, and a number of years later developed a two-lever construction with a steering handle on top of the lateral control lever, such lateral control lever moving fore and aft and the steering handle swinging athwartships (Finding XXXIX, Rec. p. 33).

Is it in Macedo, Penaud and Gauchot or other of the prior art? These either lack complete equilibrium control or are essentially two-handed.

3. Which one of these imposes any limitations upon even the *broadest* of the claims in suit, let alone claim 8? Which is directed to the characteristic joy-stick responses?

The petitioner does not tell us.

Nor does the Court of Appeals.

Both deal in generalities. They say in view of the use of vertical levers in the art, it would not involve invention to, let us say, make the 1906 structure into the invention in suit. Let us see what this would produce.

a. We turn the horizontal levers of the 1906 structure into vertical levers, and immediately the equilibrium lever of 1906 becomes inoperative to produce any lateral control whatever. It is no longer a universally mounted lever; it is a simple lever which can turn on its own axis, and this turning would compel the turning of the wings for lateral control by twisting the equilibrium lever like a screw-driver—an obvious impossibility. This is admitted by petitioner's own expert (Rec. p. 59).

b. Somehow, however, we surmount this, and we still have *a two-handed control of equilibrium.*

c. In other words, one cannot take the two-handed 1906 structure and *combine it* with the other two-handed structures in the art and make a *one-handed structure.*

The truth is the invention in suit *had to be made,* the solution of the control problem *had to be found,* before any one could discover anything in the way of mechanism to effect it.

4. The petitioner proposes a formula for the 1906 structure, viz.: Move the end of the stick up to go *up;* move it

down to go *down;* move it to left to roll *left;* move it right to roll *right.*

Now this formula is not the joy-stick rule of action. That rule is "tilt the stick in the direction you wish the plane to tilt." The vertical arrangement of the joy-stick, combined with the ailerons and elevator, produces a combination in which the attitude of the plane is a *constant and dependable index or indicator* showing the direction the stick should be tilted for any of an infinity of attitude corrections. It is an equally reliable index or indicator for telling the pilot *just in what direction it should be tilted* to obtain a similar tilt of his plane for any maneuver.

These are totally absent from the 1906 structure. If the 1906 structure were one-handed, instead of two-handed, it would still be much inferior to the joy-stick structure, for the above reasons.

5. The petitioner states on page 49 of its brief that the general incidence control of the left-hand lever of the 1906 patent is not here in controversy. This general incidence control was a part of the 1906 disclosure and cannot be eliminated any more than the right-hand lever can be eliminated. The respondent evidently at that time thought the general control of the incidence of all four wings was necessary to make his machine, which was a tandem plane, take off, ascend and descend. He evidently believed that his right-hand control could not perform these operations. We cannot say he was wrong, for the plane was never flown.

What he *disclosed* by drawing and description required the constant use of two hands, and had little of the virtues of the joy-stick.

6. On page 50 of petitioner's brief the petitioner says that respondent did not solve the problem of equilibrium, although he endeavored to. If respondent had, he would be standing in the shoes of the Wrights as the first to fly. He never claimed he did.

Petitioner neglects to finish the lower Court's sentence, which was to the effect that respondent directed his attention to a "mechanism which would control the organs of an airplane * * * a mechanism as indispensable to the flight of a plane as the wing surfaces thereof."

From page 51 to page 59 petitioner's brief presents such a mass of misinformation with regard to the structures of the patent that we refer to the findings of fact, which are conclusive on the disclosure of the patent. These are Findings XIII, XIV and XV. They refute completely most of petitioner's statements.

In brief, however, we would state:

1. The ring-tail structure has the characteristic joy-stick responses which are standard all over the world.

2. The bird-tail has the same responses. Fig. 7ª, of all the views showing the bird-tail, contains a draftsman's error. Fig. 7ª is not a "modification," but merely a view of Fig. 10.

3. The tandem monoplane is a modification which is not described with particularity, the suggestion of the specification saying that one pair of wings may each be mounted and operated like the bird-tail. No mechanism for doing this is shown or described.

There is no statement in the specification of the patent in suit that this tandem plane may be operated by the "two horizontal levers of the 1906 French patent," petitioner's statement to the contrary notwithstanding.

4. There is no excuse for petitioner's statement that the drawings of the application were "shuffled in and out" in a kaleidoscopic or in any other manner. New drawings were filed when required by the Patent Office.

5. There is no validity in petitioner's statements that with the bird-tail the steering is reversed as the bird-tail passes neutral. The bird-tail is a cambered surface, always forming a part of the lifting surface of the plane (see Finding XIII, Rec. p. 17).

It never passes the neutral point. It is an elevator which acts to nose the plane up or down, by bearing less or more of the load—a common expedient. The steering lever never reverses its responses.

6. On pages 56 and 57 of petitioner's brief, the petitioner has for the first time acknowledged that the levers of the 1906 patent are interdependent, and not independent. This is in accordance with Finding IV (Rec. pp. 7-8). It proves conclusively that the 1906 patent has a two-handed equilibrium control, and that the shifting of the levers to a vertical position, if it could be done, would still leave it a *two-handed control.*

7. On pages 57 *et seq.* of petitioner's brief, petitioner refers to cross-responses by which slight steering effects may arise from elevator action. The findings (Findings XIV to XVIII, Rec. pp. 19-21) expressly state that no material cross-responses are present, and that all of the controls function to produce the results set forth and claimed. We refer to this more in detail on pages 60-62.

Nothing in the disjointed, fragmentary, and often erroneous, statements in this section of petitioner's brief shows the slightest valid reason for limiting the claims in suit to the ring-tail and bird-tail constructions.

A curious situation arises in this connection: The Court of Appeals is sponsor for this limitation. But the Court *does not say to which of these two specific constructions* the patent should be limited. The Court of Appeals apparently meant both.

But any claim broad enough to include both these constructions would include all conventional planes. These latter differ from the ring-tail only in that the elevator and steering rudder are mounted directly on the fuselage in the conventional plane, instead of indirectly by means of a ring as with the ring-tail.

But the *bird-tail* dispenses with a steering rudder altogether and makes the elevator perform the steering function.

The conventional tail structure is, hence, in detail much

closer to the ring-tail *than is the bird-tail.* So a claim broad enough to cover the ring-tail and bird-tail could not fail to also include the conventional plane.

The ring-tail has three elements forming the tail structure, viz., the elevator, steering rudder and ring. The bird-tail has but one element, viz., the elevator. The conventional plane has two, viz., the elevator and steering rudder. A claim covering a three-element structure and a one-element structure should cover also a two-element structure.

III.

The joy-stick mechanism shows clear invention over respondent's 1906 French patent.

On page 60 of petitioner's brief, under the title "The Vertical Control Lever Did Not Constitute Invention Over the Structure Disclosed in the Respondent's 1906 French Patent," petitioner advances some arguments seeking to support this view.

We have discussed this question to a certain extent under the preceding heading. We will here take it up in more detail.

A comparison of the 1906 structure and the structure of the patent in suit yields the following results.

(1) The 1906 structure had a horizontal right-hand lever which is alleged to control both equilibriums. As a matter of fact, *it did not,* as any consideration of the structure will show. The Court of Claims correctly analyzes this in Finding IV (Rec. p. 8), when it states:

> "* * * As the forward ends of both the right and left-hand levers must operate as fulcrum points during certain control manipulations and the levers are thus interconnected, it is essential that the pilot must continuously keep hold of both levers."

This must be taken as a fact in this case, and it should end the contention raised on this point.

If the pilot lets go the left-hand lever, all control of longitudinal equilibrium is gone, since the pivoted wings are free to assume any position that the aerodynamic forces compel them to take. Since a large majority of equilibrium corrections have a longitudinal component, it follows as a matter of course that during the greatest part of the time proper corrections cannot be made.

Furthermore, and perhaps more important, any plane traveling at level keel and in perfect equilibrium will immediately go out of equilibrium and get beyond control if the longitudinal control is released. This is particularly true of the type of plane shown in the 1906 patent, wherein the pilot is holding the entire four wings in position by main force.

(2) When the pilot uses two hands for equilibrium, he must move one hand and set up an opposite stress with the other hand. That is to say: when he moves his right hand in the 1906 structure, the left hand must resist the movement of the right hand. That imposes some necessity, at least, of mental operation. Added to this is the fact that the opposition of the left hand must be combined very frequently with the definite movement of the left hand for steering. In other words, when all is said and done, the steering efforts of the left hand are mixed up with the equilibrium control in that they must be frequently performed simultaneously.

(3) The 1906 structure is entirely devoid of one of the most important features of the joy-stick structure. In the joy-stick structure the attitude of the plane during an unbalanced tilt, as we have shown in our opening statement, constitutes an unfailing index or indication of the point to which the joy-stick should be moved to correct that particular tilt. Even assuming that the 1906 structure was a real one-handed equilibrium structure, such an indication is entirely lacking. The pilot would be obliged to guess where to move the right-hand lever, even if it had sole control of equilibrium. With the joy-stick all the guess is taken out. Now, if the pilot had but a single, occasional, corrective

movement to perform, one might become sufficiently skilled with the 1906 structure to be able to make a fairly good guess. But the guessing is mental and calls for attention on the part of the pilot. When the actual conditions of flight are considered, however, and it is borne in mind that the necessity for one equilibrium correction follows another, sometimes in very rapid succession, the ability of the joy-stick to move directly from one indicated position to another indicated position is of great importance. As most of the corrections are compound, this importance is enhanced. In the 1906 structure the confusion in meeting these conditions would be very great.

(4) The 1906 structure, even if it were a one-handed structure, does not take advantage of the instinctive feature of the joy-stick. One might concede a certain amount of instinctiveness in the lateral control in the 1906 structure, but longitudinal controls are not instinctive. The right-hand lever being horizontal, it does not respond to the movement of the pilot's body for longitudinal control; if it did, the response would be contra-instinctive. The net result is very much the same as though a man on a rolling and pitching ship were required to lean in a natural way toward the high side of the ship when the latter rolled, but when the ship pitched, he did not lean at all, or leaned toward the low end.

(5) We have previously alluded to the formula invented by petitioner's counsel, that with the 1906 patent one pulls up on the lever to go up, pushes down on it to go down, pushes it to the right to roll to the right, and pushes it to the left to roll to the left. There are several objections to this formula. Going up and down are *altitude* maneuvers; rolling right and left are *attitude* maneuvers. It would be frequently necessary, if the 1906 structure were actually flown, to pull up on the lever—not when the plane was intended to go up, but was intended to go down less acutely, as in landing. The same thing occurs in ascending.

With the joy-stick, the position of the stick has to do not with the altitude, but with the angular attitude of the ship.

Can the Court imagine an airplane having a large handle immovably fixed to the latter in a perpendicular position, and a giant hand grasping the handle, and always accompanying the plane and capable of moving the entire plane by the handle? And then visualize the handle being moved to restore the plane to balance whenever it departs therefrom, or to tilt the plane bodily in whatever direction the pilot wishes for any maneuver? If so, the Court will obtain a fairly good idea of the operation of the joy-stick. The pilot does the same things in substance when he uses the joy-stick.

(6) In the 1906 structure—assuming that it was a true one-handed control—when the pilot wished to make a maneuver, the method of operation by which he can make the desired inclination of his machine is not nearly so simple as with the joy-stick structure. In the joy-stick structure the pilot simply moves the stick directly toward that part of the plane which he wishes to lower; let us say, in making a bank, or a diving bank, or any other maneuver. If he has miscalculated the angle, a slight shift of the joy-stick toward the proper point is simplicity itself. With a horizontal lever the orbit of movement of the handle end bears no direct resemblance to that part of the ship which the pilot desires to lower or toward that point which the pilot desires to incline. As before stated, with the joy-stick the pilot does not have to lay out any particular proportion of longitudinal and lateral tilt to obtain a desired maneuver. The joy-stick mechanism does this for him. The rule that one tilts the joy-stick in the way that the plane is desired to be tilted is sufficient, and this in turn becomes highly automatic.

This is, of course, as before stated, even more true in the corrective movements of the stick.

(7) A final proof of the inventive superiority of the joy-stick is that any industry is best judge of the efficiency of its mechanisms. Many years ago the airplane industry unerringly and practically unanimously selected the joy-stick as the control which it desired to use. It will have no

other to-day, wherever the plane is not so excessively heavy and large that it requires more power than the unaided strength of the pilot can give. In the United States, at least, the 1906 mechanism was open to free use; the joy-stick mechanism was not. No one ever used the 1906 mechanism; everyone has used the joy-stick mechanism. This was not due to advertising, pushing, or to any other reason except sheer merit.

Whatever may be said of petitioner's made-up formula for the 1906 structure, it is certainly not the formula of operation for the joy-stick structure. The industry is unanimous in adopting the joy-stick formula and unanimous in rejecting the 1906 formula.

(8) The Court of Claims said (Rec. p. 59):

> "* * * plaintiff's scientific knowledge immediately disclosed to him the fatal defects in his first French patent [that of 1906], and he promptly abandoned it. No such device was ever constructed, and, almost immediately following, the vertical lever mechanism came into existence. * * *"

The petitioner criticizes this on the ground that this 1906 structure was included in the first application papers which arrived too late in this country. We have discussed this on page 25. It did have fatal defects from the standpoint of operation; but from the standpoint of what it disclosed, looking toward a proper control, any attorney would have included it for what it was worth in the application which was originally prepared for the United States.

Had this been filed within the year, *it would at least have completely neutralized the long and vigorous contentions of the petitioner which we are now discussing.*

But this unsuccessful attempt by respondent to include the 1906 structure in the present application in no way disturbs the *facts* upon which the invention of the joy-stick mechanism are clearly founded. It does not make the 1906 structure any other than a two-handed control; it does not make that structure a simple, direct, self-indicating control;

it does not make that structure take advantage of the instinctive balancing movements of the pilot. These are facts. The petitioner's remarks are arguments, without foundation.

(9) On page 63 the petitioner reiterates that it was not invention to change the levers from the horizontal to the vertical. When so distinguished an expert as Mr. Arthur S. Browne states that this could not be done while still retaining lateral control, this has more probative effect than the arguments of counsel (Rec. p. 59).

(10) In a footnote at the bottom of page 63 the petitioner relies on *Atlantic Works* v. *Brady*, 107 U. S. 192, 199-200, quoting extensively from that decision. In that case all of the elements were old and the combination accomplished no new result. It amounted merely to supplying a boat with a front screw where the rear screws had been used for the same purpose.

The petitioner has persistently avoided any discussion of the actual facts of the art here under consideration. As found by the lower Court (Finding XXXIX, R. p. 33), up to 1912 the two standard airplane controls were the second Wright control and the Curtiss control. Neither of these was prior to the invention of the patent in suit. They represented the best that the most prominent experts in the art in the United States could produce. They were nothing like the joy-stick mechanism, and they were promptly discarded when the virtues of the joy-stick became apparent to the United States at its entry into the war. The conclusion is irresistible that the United States, for its army and navy, demanded the best and found that it did not have it.

We call attention to the testimony of General Foulois (petitioner's witness) on this point (Rec. p. 51).

This was not a trifling device, a shadow of an idea, which would naturally and spontaneously occur to any skilled mechanic. It did not naturally or spontaneously occur to the two acknowledged masters of the art, or to any others. Instead of being a trifling improvement, it is of supreme importance in the art of aviation, and has greatly increased the safety of flying.

IV.

Disclosure supports claims in suit.

On page 66 of petitioner's brief, under the heading "The Claims of the Patent in Suit Are Not Supported by the Disclosure," the petitioner argues that the construction shown and described does not support the claims in suit. Petitioner makes statements which are absolutely contrary to the findings. The contention of petitioner, which is quite exploded in this case, is based upon the assumption that it is necessary in respondent's structures to operate both the joy-stick and the steering lever in order to obtain equilibrium control. This in turn is based upon the theory that there are so-called "cross-responses," and upon this theory alone. The cross-response complained of is a variation in steering when the elevator is used and a variation in pitch when the steering lever is used. This theory was foisted bodily on Judge Campbell and the Court of Appeals.

Cross-responses are ascribed to the ring-tail structure shown in the patent by reason of a slight pendulous movement, due to the ball-and-socket mounting, and having an amplitude of only about 7 degrees to each side of the vertical. Such pendulous movement is not referred to in the patent: is no part of the patented structure; is restrained by the connections shown in the patent, so that it does not occur in practice, and, if it did occur, could be restrained by the simplest sort of a guide, since it forms no part of the operative parts and does not enter into the operation of the device (Finding XV, R. p. 19).

It is an indication of the flimsy character of the defense in this case that petitioner has made so much of it, even going to the extent of misdescribing the patented control throughout its brief as a two-handed control.

To show that such a cross-response did not exist in any appreciable measure, respondent built a ring-tail structure and successfully flew, at Amityville, Long Island, N. Y., an "Aeronca" plane with such ring-tail structure substituted for

the usual tail structure. In constructing this ring-tail structure respondent made it with *twice* the needless pendulous movement shown in the patent. The testimony was that if there was any cross-response, it was not noticeable to the pilot and that the control lever and steering lever operated independently of each other, each to secure its intended result.

The petitioner in this case went to the extraordinary lengths of fitting out two full-sized planes and testing them in wind tunnels. These tests proved exactly nothing.

The Court of Claims' findings in this matter are contained in Findings XIV, XV, XVI and XVII (Rec. pp. 19-21). We quote from Finding XV:

> "* * * Irrespective of the cross responses, the pilot may use the left-hand lever to steer the airplane to the right or left and use the right-hand lever to effect a change in either the pitch or transverse attitude of the airplane" (p. 20).

We quote from Finding XIV:

> "* * * The presence of such cross-response in this second modification [bird-tail], illustrated and described in the patent in suit, does not impair the operativeness of either of the right or left-hand levers and each lever performs its function regardless of the position of the other lever" (p. 19).

We quote from Finding XVII, referring to the Amityville flights with the "Aeronca" plane:

> "* * * In all flights the steering and stabilizing levers were mechanically separate and independent and each lever performed its own function regardless of the manipulation of the other lever" (p. 21).

This whole defense is particularly disingenuous, since every tyro in the art of flying knows that all airplanes have minor cross-responses in normal use. This is due to the extremely sensitive condition of an airplane when it is aloft. Changing any one airfoil surface tends to involve a change in the attitude of the plane not accounted for by the changed surface.

The Court of Claims, in Finding XVIII, refers to these cross-responses in all airplanes. If the Court will read the basic Wright patent, No. 821,393, it will see that Wright's whole theory of flight was concerned with the offsetting of errors in steering which came from using the transverse equilibrium control. To neutralize this Wright connected up his transverse equilibrium control with his steering rudder so that such errors would not occur. While this undoubtedly aided the Wrights in their first flight, they speedily disconnected the steering rudder and warping wings, and from that day to this such connected rudder and wings have never been used.

Respondent did not repeal the laws of aerodynamics when he produced the joy-stick mechanism. Airplanes still have cross-responses of various kinds, and it is a part of the duty of the pilot to correct them with the proper organ. It simply constitutes another call on the pilot's attention and increases the desirability for a control which can instantaneously and certainly make proper corrections.

Respondent was not dealing with cross-responses at all. He was dealing with a control system.

Whatever excuse the record in the *Chance Vought* case may have afforded the District Court and the Court of Appeals for accepting the defendant's preposterous theory, the record in the case at bar completely forecloses this defense. It never had any merit, and the Court of Claims goes out of its way in its findings to completely scotch it.

V.

The patent is not invalid on the ground that the claims in suit were not inserted in the application until 5½ years after filing, while the device came into general use prior to that date.

This is discussed on page 68 of petitioner's brief.

It raises one of the three questions of law which are presented for review.

The *facts* stated by the petitioner are either erroneous or inconsequential, and consequently its law is misapplied.

The original application for the patent in suit was prepared in France, where the rule is that the claims do not limit the invention but are merely a recital of various parts. The application contained the following claims:

> "4. An aeroplane in which the controlling is effected by two separate levers, rigid transmissions for controlling the distortable wings and both rudders."
>
> "6. An aeroplane in which the controlling methods of the rear tail forming the rudder is carried into effect by means of two levers symmetrically arranged with reference to the pilot seat, the left-hand lever, for example, causing through a cardan system the rotation of the rudder about a longitudinal horizontal axis, and the moving of the right-hand lever causing the inclination thereof about a transverse horizontal axis."

Doubtless these claims are informal according to the American practice. But, equally doubtless, they gave notice of the invention which was to be claimed.

The application was filed on January 16, 1908. The Examiner on March 10, 1908, required a new specification in grammatical and idiomatic English; he also required new drawings, because the drawings in the case were diagrammatic. The claims were objected to as being functional.

On February 1, 1909, respondent filed an amendment in which he presented a new specification in idiomatic English and new drawings and a new set of claims. This specification conformed to the original showing, and petitioner carefully refrains from stating that it did not.

It is insulting to anyone's intelligence to state that "this was a lawyer's contrivance." No new oath was required by the Patent Office, and none was filed (Finding X, Rec. p. 13). If there had been anything calling for the filing of a new oath one would have been required by the Patent Office.

The claims inserted by this amendment of February 1, 1909, involved nothing new over the original showing.

By this amendment of February 1, 1909, the claims, as well as the specification, were presented in formal shape in response to the Examiner's requirement. One of these claims, presented as claim 7, was *immediately allowed* by the Patent Office, remained continuously in the application until the date of issue, and is now claim 2 of the patent in suit, being one of the claims in issue.

This claim is as follows:

> "2. An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder."

This claim was renumbered claim 6 by the next amendment (File Wrapper, p. 34). It was again numbered 7 by the third amendment (File Wrapper, p. 37). It was again allowed by Office action of May 10, 1910 (File Wrapper, p. 46). Its number was changed to 3 by the fifth amendment (File Wrapper, p. 49). It was again allowed on May 27, 1911 (File Wrapper, p. 52). It was subsequently numbered 2, as it appears in the patent (File Wrapper, p. 61).

This claim covers each and every one of the petitioner's structures in issue and every modern plane having a single equilibrium control lever. The term "distortable wings" is a generic term. There is no dispute about that in this case. In respondent's device the wings were distorted by warping them. In more modern planes the wings are distorted by warping only a portion of them, which is hinged to facilitate the warping and, as before stated, is known as ailerons.

Petitioner's planes and all modern planes using the joy-stick control have distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability (elevator), a lever controlling said wings and said rudder (joy-stick), a steering rudder, and a separate lever (usually a foot lever) controlling said steering rudder.

The presence of this claim in the application for the patent in suit from February 1, 1909, down to the issue of the patent, completely disposes of any question of laches or intervening rights.

There were no joy-stick airplanes in this country, in public use or otherwise, when present claim 2 was introduced into the application on February 1, 1909. This is clearly set forth in Finding XXXVIII and must be accepted as a fact in the case.

The same amendment of February 1, 1909, introduced two claims, originally numbered 12 and 13 (File Wrapper, p. 27).

Claim 13 is as follows:

> "13. An aeroplane having means for controlling its inclination and a single lever for operating said means to control both the longitudinal and the transverse stability of the apparatus; said lever being arranged to oscillate in different vertical planes, means for transmitting its movement in one plane to the means for governing the longitudinal inclination, and means for transmitting its movement in the other plane to the means for determining the transverse stability, said lever being mounted to permit also an oblique movement having components in each of said planes so as to actuate simultaneously the means for establishing longitudinal stability and that for establishing transverse stability."

This claim also covered every plane ever used by petitioner or anyone else having a single lever control of both ailerons and elevator.

Petitioner not only admits this, but goes further, and says that claim 13 was *broader* than the claims in suit (see Petitioner's Brief, p. 76). That is, for the purpose of this "*intervening rights*" argument, no claim had been presented in the application for 5½ years after its filing date, which would cover petitioner's planes. For the purpose of its "estoppel in the Patent Office" defense, claim 13 is said to be so broad as to cover petitioner's planes, and, since this claim was erased after rejection, the claims in suit must be so narrow that they *do not* cover petitioner's planes.

The petitioner should make up its mind *which* is right.

The *fact* is that claims 12 and 13 of the amendment of February 1, 1909, were substantially identical with claims 5 to 9 in suit, and differed only in terminology.

Claims 12 and 13 were erased from the application on May 23, 1912. The claims in suit were made on June 12, 1913—about thirteen months later.

Quite aside from the continued existence of claim 2 in the application from February 1, 1909, down to and including the issuance of the patent, the Court will note that the application *was never without claims of the scope of the claims in suit for a period of more than thirteen months.*

Consequently, if there had been all the public use in the United States which the petitioner could wish, there was no period of two years when the application was without claims which would cover the machines so used in public.

But, as a matter of fact, as shown in Finding XXXVIII (Rec. p. 32), the Bleriot and Farman planes brought to this country and the planes said to have been built here involving the joy-stick, were not here at any time when there was an absence from the application for the patent in suit of claims 12 and 13 or their successors, claims 5 to 9 of the patent in suit.

Under the doctrine of *Chapman* v. *Wintroath*, 252 U. S. 126; *Westinghouse* v. *Jeffrey De Witt*, 22 Fed. (2d) 277-279, and *Jones* v. *Freed-Eisemann*, 47 Fed. (2d) 174-177—which is the only doctrine that could have any bearing in a case like the present—this Court and others have specifically held that there must be a period of two years' activity by a third party *before* claims were presented in a division, or inserted in an application, in order to constitute laches or be subject to intervening rights. There was no period of two years anywhere in this case that the application did not contain a claim or claims amply covering the joy-stick mechanism. It was covered by claim 2 from February 1, 1909, on, and by claims of the type of claims 12 and 13 from February 1, 1909, down to the date of the patent with the exception of an interval of thirteen months. There can be no laches or intervening rights under these circumstances.

The decisions to which the petitioner has referred, therefore, do not apply. Strictly *new matter* which was never founded in the original application cannot be introduced at any time. As to matter which was founded in the application but which was not originally claimed, this may be claimed at any time within two years after someone else enters the field.

In view of the foregoing, petitioner's allusions to a five and a half year period in the present application are purely imaginary. It does not exist in this case.

VI.

Respondent did not acquiesce in the rejection of claim 13 and is not now estopped from asserting that the claims of the patent in suit should be construed to cover the vertical control lever.

Under a similar heading, on page 76, petitioner in its brief urges its theory of estoppel, this being the second of the three questions of law raised by the petition.

Whereas, under the preceding heading, petitioner is satisfied that claim 13 is too narrow to cover petitioner's planes —and that no claim broad enough to cover them was introduced until five and a half years after the filing date— petitioner now urges that claim 13 was in fact a *broad claim* —so broad that it covered the joy-stick mechanism when used for maneuvers. Claims 2 and 5 to 9 of the patent now become so narrow that they cannot be interpreted broadly enough to cover petitioner's planes because of the estoppel arising from the erasure of claim 13 in the Patent Office.

What is the real fact?

As we have before indicated, claims 12 and 13 of the amendment of February 1, 1909, were substantially the same claims as claims 2 and 5 to 9 of the patent in suit.

There can be no estoppel under these circumstances. This is made clear by the decision of this Court in *Overland* v. *Packard,* 247 U. S. 417—wherein it was held that the Patent

Office has a right to give reconsideration to claims of the same scope as those which have been erased and that, if it allows such claims, nobody can complain.

This is the regular practice in the Patent Office, since during the prosecution of an application much more light is thrown upon the invention and the prior art, and the Patent Office often sees that it is in error and, naturally, corrects it.

We shall show later than even if claims 2 and 5 to 9 were mistakenly limited to the use of the joy-stick mechanism solely for equilibrium purposes, there would be clear infringement by the petitioner's planes, and the lower Court has so held.

We now propose to show that the claims in suit should not be so limited and that they are substantially the same in scope as claims 12 and 13 of the amendment of February 1, 1909.

In the Claims in Suit Respondent Used the Common Terminology of the Art. In the early days at the time of respondent's invention, airplanes were very difficult to fly and, as stated by the Wright brothers, the main trouble was in obtaining equilibrium. Of course, any plane which flew had to take off from the ground and return to the ground, for w' ch purpose it required an elevator. It had to bank in making turns, for which purpose it required distortable wings. But these two operations were comparatively seldom performed, as contrasted with the ever-present necessity of maintaining equilibrium. The ailerons and elevator, therefore—while they were always used for ascending, descending and banking—became known in the art by their principal use; they were called equilibrium organs, stabilizing organs or balancing organs—all of which terms were in common use. A plane was said to be in stable condition when it was balanced. It was also said to be in equilibrium. The respondent in his patent might have used the phrase, "means for producing balance" or "means for producing equilibrium." He chose the phrase "means for producing * * * stability." He might also have used the term "means

for controlling the attitude of the plane," but this phrase was not as commonly used as any of the others above quoted.

No matter which phrase he used, he would have been understood thereby to have meant a broad term for the two organs in question—namely, distortable wings and elevator. No one would have questioned at the time of respondent's application that these terms included the use of the organs for ascending, descending or balancing, as well as stabilizing.

These Organs Do Not Have Two Functions. Petitioner proceeds on the theory that the ailerons and elevator have one function when they are balancing or stabilizing, and another function during maneuvers. This is entirely erroneous. They have each but a single function, and that function is the turning or inclining of the airplane around an appropriate axis. The distortable wings always turn the airplane around the longitudinal axis, and the elevator always turns it around the transverse axis. They do this in precisely the same way, irrespective of the purpose which the pilot has in mind when he operates them. He may, and usually does, operate them at one instant to bring his plane back to balance, while at the next instant he uses them in exactly the same way to incline the plane in precisely the same manner when he wants to change the attitude of the plane for a premeditated maneuver. In other words, the phrase "means for maneuvering an airplane"—so far as it relates to the *attitude* of the plane—means exactly the same thing as "means for stabilizing an airplane."

Illustration of the Lack of Distinction Between Maneuvering and Balancing. A simple example will illustrate the truth of what we have just said.

An airplane, let us say, is proceeding at level flight and, just as the pilot is about to make a turn and bank, the left wing is depressed by a gust. The pilot, *to restore his stable attitude,* moves the joy-stick to the right; the plane then turns on its longitudinal axis until the left wing is level again. The pilot, now having regained control, proceeds to turn to the right. To effect this *maneuver,* he banks the

plane to the right. It is done by the pilot's holding the joy-stick in precisely the same position that he had it for the balancing operation; that is, in its inclined position to the right, and the plane having been levelled by the restoring movement, the left wing continues to rise for the bank.

Now, in this very ordinary occurrence, the pilot has done nothing whatever to the joy-stick or the ailerons except hold them in place; and yet, according to petitioner's theory (in which, of course, it is mistaken), when the pilot first moved the stick to the right, he was infringing the patent because he was producing stability; when he held the stick to the right for the bank, he was not infringing the patent because he was producing a maneuver.

Patents are not granted for this sort of thing. They are granted for mechanisms. On petitioner's theory the patent would depend on the pilot's intention.

There Is Nothing in the Specification or in the Prior Art of the Patent in Suit Which Imposes Any Such Limitation. The file wrapper may be searched in vain, the prior art cited by the Patent Office may be searched in vain, and the defenses set up by the petitioner may be searched in vain for anything which would impose the limitation which the petitioner wishes, namely, that the claims in suit are limited to purely stabilizing movements. The same organs were used throughout the art for both purposes and it was merely a matter of what they were called. Sometimes they were called stabilizing means, other times equilibrium means, and other times balancing means or means controlling the attitude of the plane. The specification of the patent in suit makes no such distinction as is desired by petitioner.

The Court of Claims in its *Findings* establishes the fact that even if the claims are so limited they are still infringed by petitioner's airplanes, since petitioner's airplanes, in fact, use the joy-stick combination for stabilizing or balancing purposes.

Throughout the Findings, however, it will be seen that the Court includes in this term the use of the same mechanism for maneuvering.

Claim 13 was of substantially the same scope as the claims in suit. Claim 13 uses the terms "means for controlling its inclination," "control both the longitudinal and transverse stability," "establishing longitudinal stability," "establishing transverse stability," "governing the longitudinal inclination" and "determining the transverse stability." These varied terms are simply an assortment of names meaning the same thing. In claims 5, 6 and 9 in suit the single phrase is used, "means for producing * * * stability." The scope of the claims is substantially the same as that of claim 13.

This is illustrated by claim 8 in suit. This claim first recites substantially the combination of claim 5 and then proceeds to give the specific preferred responses. The operation is said to be to "direct the airplane downwardly," "to elevate the airplane," "to raise the airplane on the left and right, respectively." These phrases are not limited to equilibrium movements. They include both equilibrium movements and control movements. This claim, hence, very aptly illustrates what we have said, that the terms "means for producing lateral stability" and "means for producing longitudinal stability" refer to the organs themselves. There is no need in claims 5 and 6, for instance, to further identify them. In claim 8, however, it is necessary to more specifically describe them. This claim, hence, sets forth what the means for producing stability do when operated. They direct the airplane either downwardly or elevate it. They raise the airplane either on the left or the right. As before stated, such changes in attitude are for any purpose, whether to control for stabilization or to control for maneuvers.

VII.

Petitioner's contention that Esnault-Pelterie was not the inventor of the airplane control lever is clearly wrong.

On page 79 of its brief petitioner makes a so-called argument which is a tissue of misstatements. The true facts are these:

Respondent signed an agreement with Bleriot which had nothing whatever to do with the inventorship of anything, much less the joy-stick invention.

Bleriot had used a certain control shown in the so-called Vautrin sketch, forming a part of Finding XLIII (reproduced at page 42a, Binder). This control was an *elevator and a steering rudder* operated by one lever. At that time respondent believed he was the inventor of the broad idea of any controls mounted universally, by reason of his 1906 patent. (He was not, in fact, since an elevator and steering rudder lever had been known years before.)

The contract provided that Bleriot was in "prior legitimate and personal possession" of an invention carefully defined, viz.:

"A single lever mounted on a cardan joint."

This did not even define what the single lever did. Much less did it describe the joy-stick mechanism.

The phrase "prior legitimate and personal possession" means under the French law prior to the *application for patent*. It does not mean prior *inventorship* at all.

The Bleriot use probably interfered with the monopoly in *France* of the broad idea of a lever with a cardan joint, and hence the agreement.

It is perfectly obvious that (1) it was not the joy-stick mechanism about which respondent and Bleriot were contracting; and (2) there never was an admission of use prior to any *invention* of respondent, but only prior to the French application.

Finding XLVI completely disposes of this alleged defense. Neither the Court of Claims nor the Court of Appeals gave it any weight whatever.

And yet the petitioner persists in saying many times that respondent solemnly admitted that Bleriot was the actual inventor of the joy-stick mechanism, and that respondent was not.

Petitioner winds up its fantastic argument by saying that at least the invention of *claim 2* was admitted to be Bleriot's.

It was nothing of the sort, and counsel well know it. Claim 2 does not cover "a single lever mounted on a cardan joint." It covers a mechanism in which an elevator or the like and distortable wings are controlled by a single lever, and in which a steering rudder is controlled by a separate lever.

In the Bleriot construction the *elevator and steering rudder* are *controlled* by a single lever—a construction which is immeasurably inferior to the joy-stick mechanism, and which Bleriot abandoned in favor of the joy-stick construction.

Petitioner's remarks about disclaimers, oaths, unreasonable delay, etc., in connection with the Bleriot matter are entirely meaningless.

Ferber. Ferber published two books relating to aeronautics, one in 1904 and one in 1906. Neither contains the slightest suggestion of the joy-stick.

Petitioner took the evidence of several Frenchmen (Peyret, Burdin, Niepce, Lacan, David and Didillon) as to Ferber's work in France. The Court of Claims refused to consider this use in France as a defense under Section 4923, R. S., which expressly rules out such evidence. It has been a principle of our law for about 100 years that a use abroad is no defense against a United States patent.

This is now embodied in Section 4923, R. S. (U. S. Code, Title 35, Sec. 72), which is as follows:

> "Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been known or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication."

In a footnote on page 84 of its brief, the petitioner suggests that this Court should, in effect, amend the statute so that Ferber's work in France may be used as a defense in this case. Petitioner states that it is "highly doubtful"

whether it could be said to be within the intendment of the statute that prior use in a foreign country should not bar the issuance of a patent to a citizen of the same country as that in which the use took place.

The provisions of Section 4923 constitute one of the oldest principles in the American patent law, and we take it that this Court will not deliberately amend this section as suggested. The section applied to any patentee, whether a citizen or an alien. It has its foundation on Section 7 of the Patent Act of 1836, which provides that a patent shall be allowed—

> "* * * if * * * it shall not appear to the Commissioner that the same had been invented or discovered by any other person *in this country* prior to the alleged invention or discovery thereof by the applicant, or that it had been patented or described in any printed publication in this or *any foreign country.* * * *" (Italics ours.)

In the general revision of the patent statutes, approved June 22, 1874, Section 4886, R. S., provided that any person who had invented a device—

> "* * * not known or used by others *in this country,* and not patented or described in any printed publication in this or *any foreign country,* before his invention or discovery thereof * * *" (Italics ours.)

might obtain a patent.

As we see no possibility that this Court will change this ancient provision of our statutes by judicial legislation, we will refrain from arguing this point further.

Even if this use had been in the United States, the proof is quite insufficient to establish the defense of a prior public use (see Finding XLI). The Court of Claims has held as facts that the Ferber planes were experimental; that none is in existence; that no contemporaneous photographs or drawings are in existence. The proof consists entirely of the recollections of the French witnesses taken twenty-five years after the event. The so-called "focs" or jibs of Ferber

started as *steering* devices (Finding XL, Rec. pp. 33-34), and never lost that characteristic function. If we may believe the witnesses, no Ferber plane had steering means separate and distinct from lateral equilibrium controlling means (Finding XLI, Rec. p. 34); in fact, they were the same "focs." Hence, the planes would not laterally balance unless they steered, and *vice versa.*

Proof such as this would not make out a case of anticipating public use in the United States.

Captain Ferber was an officer of the French Army, experimenting for the French Government. Notwithstanding Ferber's work, respondent sued the French Government for infringement of his French patents and recovered in full. If Ferber had had a real joy-stick control, this could not have happened, since the French Government would have been immune under the "prior legitimate and personal possession" rule in France, discussed with regard to the Bleriot defense.

Petitioner's allegation that Section 4923 should be amended constitutes the third of the three questions of law raised by the petitioner in its petition.

VIII.

Infringement.

The patent in suit is clearly infringed.

On page 85 of petitioner's brief, under the heading "The Patent in Suit Has Not Been Infringed by the Petitioner," the question of infringement is discussed.

The petitioner finds itself with airplanes having precisely the same general mechanism as the patent in suit. Each of petitioner's airplanes has ailerons, an elevator, and a single vertical lever movable in all directions for controlling the ailerons and elevator, just as in the patentee's ring-tail structure, for instance. The combination is such that upon

a forward movement of the vertical lever, the airplane noses down; upon a rearward movement, it noses up; upon a movement to the right, it rolls to the right, and upon a movement to the left, it rolls to the left. It thus has all of the elements of even claim 8, which covers the most complete joy-stick construction and operation. The remaining claims are, of course, clearly infringed.

When a defendant in a patent suit has a construction which contains the *entire mechanism of the patent in suit, operating in the same way,* such a defendant has a heavy burden to show that he does not infringe.

In the *Chance Vought* suit the same conditions prevailed, and there was foisted upon the District Court and the Circuit Court of Appeals what cannot be otherwise described than a hoax.

Being successful before the Court of Appeals, it was again tried in the present case. The Court of Claims—possibly assisted by much more complete evidence—saw through the petitioner's contentions, and both in the findings and in the opinion, completely discarded it.

This hoax was that the petitioner's planes were so stable as never to require ailerons or elevator to balance the plane for bringing it into equilibrium. The assertion was made that petitioner's planes were so stable as to fly themselves. Of course, since the petitioner's planes had ailerons, elevator and joy-stick, some excuse was needed to give a reason why these devices were present. The excuse supplied in the *Chance Vought* suit and copied in this suit is that the ailerons, elevator and joy-stick are only used to *overcome* the automatic stability of the plane (Pet. Brief, p. 91) for a maneuver; or, in other words, to "*destabilize*" the machine for an evolution (Pet. Brief, p. 93). With this the Circuit Court of Appeals agreed on the record before it.

This contention in the case at bar is not presented for review since the Court of Claims has found to the contrary as a fact.

Finding XXI, pages 22-23, clearly states that in the three infringing planes:

> *"The means for controlling the transverse and longitudinal equilibrium,* or pitch and roll, of the airplane comprises a vertical lever known as the 'joy-stick,' universally mounted at its lower end in position in front of the pilot so that its upper end may be conveniently grasped with either hand * * *. Through an arrangement of pulleys and cables the effect of the movement of the lever to the right causes a variance in the angle of attack of a hinged portion of the winged surfaces so that the right wing as a whole drops and the left wing rises, the machine therefore rolling to the right. * * *" (Italics ours.)

The finding then states that:

> "The 'joy-stick' or vertical lever is connected with the horizontal control surfaces at the rear or tail of the airplane, which controls *its longitudinal equilibrium* in such a manner that when this lever is pushed forward the control surfaces are so manipulated as to cause a downward movement of the rear edge of the elevator surface, which in turn results in the downward inclination of the machine. * * *" (Italics ours.)

The finding then states that a movement of the lever to the rear causes a nose-up position, and that when the joy-stick is moved in any intermediate position a consequent movement of the airplane will be produced corresponding relatively to the degree of inclination and to the direction of movement of the lever.

Finding XXII (Rec. p. 24) reiterates that the joy-stick system controls the *lateral and longitudinal equilibrium* of the petitioner's plane and that the airplane is caused to tilt with the stick in a way to *accord with the instinctive balancing sensations of the pilot.* This finding also states that the rudder bar functions as a separate lever for controlling the steering.

The same finding states as follows (Rec. p. 25):

> "*The equilibrium control lever or joy-stick of the three airplanes has the same controlling functions as the equilibrium control lever of the patent in suit.*" (Italics ours.)

The Court is asked to note that the finding, in as plain English as could be wished, thus holds that the infringing machines are constructed and operate exactly as in the patent, barring unsubstantial changes.

It is therefore submitted that it is not now open for argument that infringement is present. The Court of Claims has found that the joy-stick in the infringing planes is constructed and operates as an equilibrium lever, that it controls the inclination of the plane. Further, it is established as a *fact* that this joy-stick combination is used for *equilibrium control.* This completely throws out the petitioner's contention that its planes are so stable as *not to require the use of the joy-stick for equilibrium purposes at all.* Infringement is therefore inevitable.

Further, in the opinion of the Court of Claims (Rec. p. 73) the Court gives short shrift to this contention of the petitioner.

The Court begins with the following statement:

> "The terminology of the claims in suit is found to apply to the Government structures word for word and element by element."

It continues with cogent reasons why the petitioner's contention is wrong and ends on page 74 of the record with the following statement:

> "The three alleged infringing planes of the Government all possess the single vertical lever movable in every direction for controlling the lateral or longitudinal equilibrium of the plane connected to controlling surfaces having the same functional effects as those disclosed in the patent, and the Government cannot escape infringement on the rather remarkable theory that the Government planes fly themselves."

The underlying reasons for these positive findings and opinion of the Court of Claims on the question of infringement are as follows:

Inherent Stability. The alleged inherent stability of the Government planes is due to the arrangement of the wings so that they together make a dihedral angle or very flat V shape. The wings have also a slight sweepback. Whatever transverse stability the Government planes had is due to this structure. Whatever longitudinal stability they had is due to a similar dihedral angle between the wings taken as a group and a fixed tail surface which have the same dihedral relationship.

This dihedral arrangement is very old, far ante-dating actual flight by the Wright brothers. Practically every observer in the early art attempted to imitate the birds who have stability in flight partly by the dihedral position of the wings and the dihedral relation of the tail with both wings. They all overlooked the fact that the bird has capacity for instantly giving more or less incidence to either wing and more or less incidence to the tail feathers.

It being very difficult with an airplane to move the entire wings to give them more or less incidence, distorting a portion of them was provided by later inventors for the same purpose. This was also true of the tail assembly, the movements of the elevator corresponding to the movements of the bird's tail. All this was old prior to respondent's invention and was thoroughly understood in the art. Penaud and Gauchot in 1876 produced a machine (Binder 3-4) in their French patent No. 111,574 (Finding 15, Rec. p. 26) illustrating a construction which was almost identical in dihedral angles to the modern use of dihedrals.

No practical commercial airplane has ever been made wherein the dihedral arrangements introduced a sufficient stabilizing action to make the plane self-flying. The use of these angles being thoroughly well understood by aeronautical engineers, they are employed in many planes to produce a slight tendency to stabilize the plane. When an engineer wants a very stable plane he may use two or three degrees

of dihedral. Such, for instance, would be transport planes, where high maneuverability is not of any importance. If the engineer wishes a highly maneuverable plane he uses either zero dihedrals or very slight dihedrals.

The Curtiss JN-4 complained of in this case was an airplane in which it was desired to have high maneuverability, so it was given a very slight dihedral arrangement.

At best, the dihedral angles used are low. They give a slight tendency of the plane to right itself under normal conditions. They correspond to the tendency given to the steering wheel in modern motor cars to move back to a straight wheel position after being turned by the driver. It would be easy to make this tendency in a motor car very strong. The reason it is not done is because it would be highly dangerous since it would fight the driver's manual control of the car, his ability to make quick turns and avoid accidents, his ability to drive the car in rough roads, etc.

So also is the dihedral angle in airplanes. The self-righting tendency in an airplane caused by fixed dihedrals or sweepback constantly tends to align the plane with all gusts in ways that are quite unsafe for the plane. Even with a considerable amount of dihedral angle, the plane is too sluggish in its struggle back to normal to make it safe. What the airplane requires is the intelligence of the pilot acting through the powerful joy-stick controls to meet every emergency in lack of balance. When a plane is meeting up currents and down currents, gusts and turbulence from every direction, no *fixed* devices have ever made it safe.

Respondent's Invention Has Nothing to Do with the Presence or Absence of Inherent Stability. The use of inherent stability to the slight degree possible was well known at the time of respondent's invention. He was not trying to improve or to eliminate it or increase it. Respondent was trying to improve the manual control of the inclination or balance of the airplane. There is nothing in the patent in suit which fortifies the absurd contention of the petitioner. The patent in suit to any casual reader, let alone one skilled in the art, indicates that it was the control of the attitude

or inclination of the airplane for any purpose which the pilot required, that respondent had in mind.

The same is true with regard to the file wrapper. No distinction was made in the Patent Office or by the applicant between airplanes having fixed stabilizing means and those which omitted it. The art cited by the Patent Office made no distinction nor did the Patent Office itself in its actions.

From the petitioner's contention one might expect to find in the patent that the respondent desired to do away with the necessity of inherent stabilizing means and proposed to substitute therefor manual stabilizing. The patent does not even mention the character of the airplanes shown; whether they have any inherent stability or not.

From the foregoing it will be seen that this defense is conjured from thin air by the petitioner, and that the courts in the *Chance Vought* case were misled into a plain error.

Even the Court of Appeals Was Entirely Inconsistent in Upholding This Defense. In the quotation from the Court of Appeals decision (66 Fed. [2d] 479, second column), referred to in petitioner's brief on pages 93 and 94, after stating that "the patent has continuous hand lever manipulation for producing stability at all times," the Court makes this significant statement:

> "Appellee has automatic stability at all times, occasionally using the controls for *accentuating the automatic stability characteristics.*" (Italics ours.)

What does the phrase "accentuating the automatic stability characteristics" mean? It cannot mean other than that the controls are used to stabilize the machine when the automatic stability characteristics are either too slow or fail to work. This is a constant occurrence in the operation of modern planes having a feasible amount of inherent stability. Within 2,000 feet of the ground in turbulent air it is the rule and not the exception that the "automatic stability characteristics" do not work or do not work fast enough to avoid complete unbalancing of the plane. If he would save his life, the pilot must use the controls to stabilize or balance the machine or restore its equilibrium.

In Finding XI (R. p. 15) the Court of Claims has shown the facts with regard to inherent stability. *It is no longer an open question* in this case that in the case of planes having so-called inherent stability their banking and elevational controls (ailerons and elevator)

> "have a superimposed stabilizing tendency upon the plane and are used by the pilot for this purpose; that is to say, if the attitude of a plane in normal flight is disturbed by a gust of wind, the pilot may manipulate these controls and cause them to function in such manner as to stabilize or return the plane as soon as possible to a normal flight attitude, thus superimposing upon whatever inherent stability the plane has, an added stabilizing or equilibrium effect. The banking and elevational controls function respectively as lateral and longitudinal equilibrium controls, sometimes to assist and at other times to oppose whatever inherent stability or equilibrium has been built into the airplane."

Infringement Is Clear, Irrespective of the Interpretation of the Claims. If the claims are interpreted to cover the use of the joy-stick mechanism for all control purposes, as they should be, then all question of whether the organs are used for stabilizing or for maneuvering disappears.

But even if they are interpreted in the more limited sense of stabilizing or balancing the machine, the Court of Claims' findings hold that the petitioner's machines, *entirely irrespective of the inherent stability feature,* constantly use the combination in its entirety for stabilizing or balancing purposes.

There Is No Such Thing as Destabilizing a Plane Under Control. The petitioner says that in the government planes the use of the joy-stick mechanism is for the purpose of *destabilizing* the plane or *overcoming* its inherent stability. This is not possible while the plane remains under control. No plane is destabilized for maneuvers. What takes place in a maneuver, such as descending, banking, etc., is that the airplane by reason of the change in some air-foil surface,

such as the elevator, ailerons, steering rudder, etc., is stabilized in a *new attitude*. Thus in the ordinary maneuver of banking a turn, the moment the steering rudder is operated to make the turn, with a proper motion of the aileron to cause the machine to bank, the plane begins to assume a new attitude in which it is just as well balanced as though it were proceeding in level flight. As it continues the banking turn it progressively takes up new attitudes until the plane has reached its full bank; it continues to be stabilized during these new changes in attitude.

Were it not for these undoubted facts airplanes would go into spins every time they left a level flying condition. It is the ability of the pilot to progressively stabilize his machine in all attitudes which permits maneuvering at all.

At the same time that the maneuver is taking place the ailerons or the elevator or both are stabilizing the plane. Further than this, if one assumes a maneuver such as a curve wherein the plane has been banked and is held in such bank in stable condition, the plane is not immune from unbalancing forces while it maintains this attitude. It is just as much subjected to gusts, air currents, pockets, etc., as when it is flying level. Indeed, it is more subject to some air disturbances in banking or other maneuvers than it is when flying level. This is for the reason that a larger surface of the airplane wings, fuselage and fixed fins is exposed to the air disturbances under the maneuvering attitudes. Applying this to the simple banking maneuver, for instance, it will be seen that after a pilot has tilted his machine upon its side sufficiently to execute the maneuver, he must constantly be on the lookout for unbalancing forces. Anywhere near the ground these forces are sure to come and the pilot must use the ailerons and elevator to rebalance or stabilize the plane in its tilted attitude.

These facts are so obvious that it is remarkable that the courts in the *Chance Vought* case accepted the extraordinary theory that the Chance Vought planes used the controls to destabilize the plane. The lack of conviction, however, of the Court of Appeals on this point is shown by the quotation

already made from the Court of Appeals decision, to the effect that the ailerons and elevator were occasionally used "for accentuating the automatic stability characteristics" (Petitioner's Brief, p. 93).

Other Contentions of Petitioner on the Question of Infringement. In pursuance of petitioner's endeavor to evade infringement it indulges in a number of pages of loose argument, most of which finds its basis in the Court of Appeals decision. Many are based upon the two falsities we have just examined, namely, first, that the joy-stick control is not used on petitioner's planes because they are so stable that they do not require any control of equilibrium, and second, the real use for the joy-stick in petitioner's planes is to destabilize or destroy or overcome equilibrium.

Some of the remaining contentions of petitioner under this heading are plain out and out word juggling not designed to enlighten the Court, but to mislead it. We will refer to a few of them.

On page 89 of petitioner's brief is the statement "these controls are used by the pilot 'sometimes to assist and at other times to oppose' the inherent stability of the plane." The quotation is from R. p. 16, but it is entirely misleading. It is intended to clearly infer that the controls are used for *maneuvering* purposes, sometimes to assist them and other times to oppose them. Finding XI states that the manual controls have a "superimposed *stabilizing* tendency upon the plane and are used by the pilot for this purpose." The Finding further says that the pilot may use these controls "to *stabilize* or return the plane as soon as possible to a normal flight attitude." The beginning of Finding XI states: "An airplane may be constructed with a certain amount of transverse and lateral stability inherent in its structure." Further, that a *stabilizing* tendency is imparted to the plane by the inherent stability features. (All italics ours.)

Substantially the same misstatement is made at the top of page 91 of petitioner's brief, where a fancied resemblance between Finding XI and the Court of Appeals decision is referred to. If the Court of Appeals decision as quoted

means the same as Finding XI, then the Court of Appeals held squarely that the Chance Vought planes had the joy-stick mechanism for stabilizing and producing equilibrium in the plane for Finding XI means just that.

In the second paragraph of page 91 petitioner states that in its infringing planes the steering rudder and elevator are entirely independent; that there is no interconnection or interrelation or cross-response except of a minor character between the vertical and horizontal rudders. Following this is a lengthy description of respondent's construction in which it is stated that any movement imparted to the elevator necessarily changes the position and attitude of the steering rudder and *vice versa*.

The petitioner does not inform this Court that it has been clearly held as a *fact* by the lower Court that any cross-responses in respondent's ring-tail embodiment do *not* impair the operativeness of either lever and that each lever performs its function regardless of the position of the other lever (Finding XIV, R. p. 19). That in respondent's ring-tail structure (Finding XVII, R. p. 21) "The steering and stabilizing levers were mechanically separate and independent and each lever performed its own function regardless of the manipulation of the other lever." These findings entirely negative petitioner's statement.

On page 92 petitioner makes the statement that respondent's steering and pitching controls are "interdependently connected." The aforesaid Finding holds to the contrary.

On the same page petitioner makes the statement that in the tandem wing embodiment the control of the rear wing is by the interdependent horizontal sticks of respondent's 1906 patent. This statement as appears from the quotation (pp. 92, 93) was lifted from the Court of Appeals decision. There is not the faintest justification either in the specification or the drawing of the patent in suit for this statement.

On page 93 the petitioner quotes from the Court of Appeals decision and states: "We think the Findings here establish the same facts." The Findings here establish nothing of the sort.

On page 94 petitioner quotes as a difference between the infringing planes and the patent in suit that the infringing planes are biplanes and the patent in suit relates to a monoplane; it also says that it was not until just before the grant of the patent that the title of the patent was changed from "system of monoplan aeroplane." These statements are entirely disingenuous since the *claims* in suit from the very beginning were not limited to monoplanes.

At the top of page 95 is a particularly offensive misstatement and one that the petitioner should not be proud of. It is as follows:

> "The grant of the patent in suit over the prior Wright patent was secured only by the respondent's representation to the Patent Office that there was an important distinction 'between applicant's *monoplane* and the Wright *biplane*'."

This is crass error. The remark quoted from the file wrapper was made with regard to claims which were not directed to joy-stick combination at all (File Wrapper, p. 25, for claims; p. 35 for respondent's statement).

Not satisfied with this misstatement it is repeated in the next paragraph with even more emphasis.

At the bottom of page 95 petitioner says that the claims do not find verbal response in the infringing planes much less substance. In support of this it refers to the fact that claim 2 calls for distortable wings, whereas the infringing machines have ailerons. At no time in the history of this case has the strict equivalency of ailerons and warping wings been disputed and at no time, so far as we can recall, has it been disputed that wings with ailerons are distortable wings (see Finding XXII, R. p. 24).

The balance of the argument on page 96 is merely to the effect that the lower Court is wrong when it holds that the joy-stick mechanism is used in the infringing machines for equilibrium or stabilizing purposes as found in Finding XXI, R. p. 22, and Finding XXII, R. p. 24. Also that the lower Court was wrong when it held that pitch and steering

are separately controlled in the patented structure (Findings XIV to XVII, Rec. pp. 19-21).

The remaining pages of petitioner's brief are dealt with elsewhere.

The Use of a Patented Device for Any Cognate Purpose Is an Infringement.

It is a principle of patent law reiterated many times that a patentee is entitled to control any use to which his patented device may be put. If there is any exception to this rule it would have to be where the use is exceedingly remote.

If it were true, as petitioner says, that petitioner uses the joy-stick mechanism solely to destabilize its planes, its use for any stabilizing purpose being prohibited by the inherent stability of its planes, and if it were true that the claims in suit are strictly limited to a stabilizing use of the ailerons and elevator, petitioner's planes would still infringe the patent in suit, and particularly claim 2 thereof.

Claim 2 does not use the term "means for producing lateral stability" or "means for producing longitudinal stability." It names these organs by name, viz., distortable wings and a rudder. Petitioner's machines have distortable wings beyond peradventure. The wings are distorted in the old way by ailerons. Such machines also have a rudder (the elevator). In claim 2, even under petitioner's most drastic misinterpretation, the phrase "for maintaining transverse stability" *merely describes one use* of the distortable wings. The phrase "for maintaining longitudinal stability" merely describes one use of the elevator. The petitioner's planes have a lever for controlling the wings of the plane and the rudder as called for by the claim. They have a steering rudder and a separate lever for controlling the steering rudder.

That is the patented combination of claim 2. Under the principle above referred to the respondent is entitled to cover this combination of distortable wings, horizontal rudder, a common lever for both, a steering rudder and a separate steering lever for any function they perform.

Petitioner claims (although it is not the fact) that it has a plane so stable that it flies itself, and that it uses the distortable wings, elevator and joy-stick wholly and entirely to destabilize the plane for maneuvers. While this is absurd, let us assume that it is true.

The net result is that petitioner has taken the joy-stick mechanism bodily and placed it in an airplane so that it performs precisely the same aerodynamic functions as it does in respondent's planes. These functions are that the distortable wings turn the plane in either direction around the longitudinal axis of the plane; that the elevator turns the plane around its horizontal transverse axis.

Petitioner has never denied, and cannot deny, that the movements and responses of its joy-sticks are exactly the same as in the patent in suit and as claimed in claim 8.

It is obvious from this statement, which cannot be disputed, that the claimed mechanism is used by petitioner merely for another purpose which is so exceedingly close to maintaining stability that if any one of petitioner's planes were merely to have its wings and tail surface straightened, to remove *the inherent* stabilizing tendency, the joy-stick mechanism with which it is provided would continue to function in its same old way and perfectly operate the plane.

Under the principles above referred to this is infringement pure and simple.

Much the same reasoning applies to the remaining claims. If "means for producing * * * stability" in combination with the joy-stick are bodily lifted from the patent and placed upon one of petitioner's planes where they operate in an identical fashion, and petitioner finds that they are indispensable for performing some other similar result, then infringement is present.

The situation is capable of being stated in another way, viz.:

The petitioner's planes have a complete joy-stick structure with the complete joy-stick operation as the Court of Claims says "word for word and element by element" (Rec. p. 73). It is not disputed that this structure is present on the

petitioner's planes ready at any instant to maintain or produce stability or equilibrium. If the petitioner, as it says it does, chooses to introduce inherent stability characteristics to the nth degree, if that were possible, the joy-stick structure is present, capable of performing according to the most limited interpretation given to the claims. This is infringement.

Errors in the Decision of the Court of Appeals in the Chance Vought Case.

Doubtless, as the Court of Claims says—since the Court of Appeals did not have before it the full and complete record which was before the Court of Claims and upon which its findings were made—its errors may be largely ascribed to lack of evidence. Some of them, we submit, however, are plainly apparent from the evidence which the Court of Appeals had before it.

We will refer to both classes of error below.

1. In the second paragraph on page 476 [66 Fed. (2d)] the Court states that, "In the basic French patent [the 1906 patent] * * * the stabilization producing lever (called the joy-stick by appellant)" causes the plane to go up when it is moved up, down when it is moved down, roll to the left when the stick is moved to the left, and roll to the right when the stick is moved to the right.

It is perfectly apparent to anyone who considers the 1906 patent that it would not cause all of these movements unless the left-hand lever is held by the pilot and its tendency to move resisted by the pilot. It is essentially a two-handed control (Finding IV, Rec. p. 8).

2. In the third paragraph on page 476 the Court says that the patent in suit discloses three forms of airplane, two of which have never been built—the ring-tail and tandem-wing monoplane. The Court of Claims had before it evidence that a ring-tail structure was built and tested in July, 1931, and that Court so finds (Finding XIII, Rec. p. 18).

3. Toward the middle of the paragraph the Court of Appeals says that in Fig. 6 of the patent in suit the right-hand lever is the same in function and operation as the right-hand lever of the 1906 patent. This is, of course, wrong, since the patent in suit does not require the use of two hands (Finding IV, pp. 7-8) as does the 1906 patent control.

Further, it is erroneous for the reason that the 1906 lever cannot move forward or backward.

4. At the end of this paragraph the Court says that the action of the steering rudder and horizontal rudder are interdependent. This is proven to be wrong in the case at bar (see Findings XIV to XVII, Rec. pp. 19-21).

5. On page 477, second paragraph, the Court of Appeals erroneously states that the bird-tail steers left or right in response to the corresponding and sometimes in response to the opposite movements of the steering lever, depending upon the position of the joy-stick. This is entirely in error, since in the bird-tail structure the bird-tail has always a positive incidence, since it is designed to bear a part of the load of the plane. It causes the airplane to nose up or nose down by presenting less or greater incidence to the air. There is nothing in the patent indicating that this bird-tail passes a neutral point and swings to the upper side of the fuselage (Finding XIV, Rec. p. 19).

6. In the same paragraph the Court of Appeals says, "the tandem wing is controlled for pitch, roll, and steering by the two interdependent horizontal sticks constituting the 'inherently defective' system of the 1906 French patent."

It is easily ascertained from the specification that this is plain error (p. 1, lines 53 *et seq.*, and p. 3, lines 78-82 of the patent in suit).

7. On page 477 the Court of Appeals states that in the operation of the ring-tail and bird-tail embodiments the pitch and yaw movements cannot be controlled by either lever alone. In the case at bar the Court of Claims has found directly to the contrary (Findings XIV to XVII, Rec. pp. 19-21).

8. At the bottom of the first column of page 477 the Court of Appeals states that the structure of the 1906 French patent "was operative, and could be applied to a modern plane for control." It never has been so applied or proven operative (Finding IV, Rec. p. 8).

9. At the middle of page 477 the Court of Appeals states that the appellant makes claim that there is an instinctive use by the operator of the control levers, and follows this with the statement: "But the patent makes no claim that this operation is preferred to the opposite one * * *." Of course, the Court of Appeals was in error as to this, as claims 7 and 8 distinctly claim a combination having the mode of operation from which the instinctive use flows.

10. Near the middle of this paragraph the Court states that this virtue is opposed by two out of the three embodiments illustrated and described. In this the Court makes an obvious error, since—even if Fig. 7ª be regarded as a separate embodiment (which it, obviously, is not), being described as a view of the bird-tail construction—there would be at least four separate modifications in the patent in suit—namely, (1) ring-tail, (2) bird-tail of Fig. 10, (3) bird-tail of Fig. 7ª, and (4) tandem monoplane. The specification clearly describes the ring-tail and bird-tail of Fig. 10 and their mode of operation, and states with regard to the tandem monoplane, as above quoted, that it may be operated as the bird-tail. There are, hence, four modifications and only one of these—namely, Fig. 7ª—shows opposite responses fore and aft—and this is clearly a draftsman's error.

11. In the first paragraph of page 478 the Court of Appeals refers to the Laroze patent, and states that it embodies the principle of the joy-stick control and that this control can be handled by one hand, much as an automobile steering wheel acts in response to a hand direction. This error is obvious to a mechanic skilled in the art who reads the Laroze patent. It is impossible to obtain a lateral control in Laroze with one hand, since to obtain it requires that the wheel be twisted around a vertical axis like a handle-bar, and, unless

two hands are used, a longitudinal pitch is inevitably set up (Finding XXVIII, Rec. p. 28).

12. In the next to the last paragraph on page 478 the Court of Appeals refers to the Ferber publications, and states the construction of their control. The Court also states that the Ferber booklets were prior publications and constituted prior art. It is obvious to anybody examining these booklets that no control mechanism is shown or described therein. This is a clear error of fact (Finding XL, Rec. p. 33).

13. If the Court of Appeals intended to combine with the Ferber booklets the testimony of the French witnesses given twenty-five years later as to a private use by Ferber in France, it committed a clear error of law, which the Court of Claims takes pains to point out (Rec. pp. 67-69), with a wealth of authorities.

14. In the first paragraph of the second column of page 478 the Court of Appeals gives its views on validity. The first of its conclusions was that there was no novelty in twisting the lever of the 1906 French patent from a horizontal to a vertical position and substituting a lateral pivoting movement of the upstanding lever for a rotary movement, as in Laroze. The Court apparently did not pay any attention to the extremely important results which followed the joy-stick invention. The Court's conclusion on this point was a generality. It did not state how this substitution was to be made; what changes in mechanism would have to be made to produce it. It did not state that both Laroze and the 1906 structure are two-handed structures. It did not state that in the patent in suit the very important result of making a plane follow the tilt of the stick in all directions was attained, and it did not state that substituting a vertical lever (notwithstanding the difficulty of doing it) in the 1906 patent would still make a two-handed structure.

15. The Court's next statement is that it would not involve invention to grasp the levers of Ferber above the pivot instead of below the pivot. This is a perpetuation of the error that Ferber is available at all. It is not (Finding XL, Rec. p. 33).

16. The Court's next statement is that there is no novelty in the use of a lever to operate two or three controls, or in determining as an engineering problem the choice as to which of the three controls should be operated by a single lever. This presupposes that the ideal control, when found, would be a lever control; or that the ideal control would operate two controlling organs. No one could tell these things. The ideal control might have been a slide, or a wheel, or a handlebar, or any other operatable mechanism; it might have involved the combination of the steering and elevator control, or the steering and lateral control or separate controls for all three. There was no suggestion in the prior art of the important feature of the plane's being self-indexing, so that it followed the tilt of the stick; there was no suggestion in the art of availing the pilot's instinctive balancing movements.

17. The third paragraph of page 478 limits the patent to the structure disclosed employing the bird-tail or ring-tail unit with a restricted range of equivalents. This was the result of a misunderstanding of the novelty and importance of the invention in suit.

18. On pages 478-479 the Court discusses the alleged estoppel by the erasure of claims 12 and 13. We will not repeat what we have said on pages 67 *et seq.* with regard to the question of estoppel.

19. In the third paragraph of page 479 the Court of Appeals states that the "Corsair" machine is designed and built to be inherently and automatically stable; that it may be flown with hands off the controls for long distances at a time; that the controls are usually operated when it is desired to overcome the automatic stability in order to execute some maneuver such as taking off, landing, or making a bank. We have already discussed this, and would only say that the Court failed to comprehend the ordinary operation of an airplane.

20. The Court next says, in distinguishing the "Corsair" from the patent, that the patent provides a monoplane with distortable wings, while the "Corsair" is a biplane with ailerons. As none of the claims in suit is limited to a monoplane, and as it is freely admitted that ailerons are a form of distortable wings, these distinctions disappear.

The Court then refers to the bird-tail with wing-warping to produce lateral stability, as distinguished from the inherent stability of the "Corsair." This begs the question, since the elevator and ailerons of the "Corsair" equally produce stability in the sense in which the Court uses them.

21. The Court next refers to the fact that the patent has a single lever, while the "Corsair" has dual levers; that is, the Court thinks it a distinguishing characteristic that the "Corsair" was a training plane, with *two joy-sticks—one for the student and the other for the pilot.*

22. The Court then states, at the top of page 479, second column, that the patent has levers to produce stability; the "Corsair" has handles to produce instability by destabilizing the machine for an evolution. We have discussed the impossibility of destabilizing, or producing instability for an evolution, on pages 82-84.

23. The Court then refers to the alleged fact that the patent has continuous hand-lever manipulation for producing stability at all times; that the "Corsair" has automatic stability at all times, occasionally using the control for accentuating the automatic stability characteristics. We have previously discussed this point. Accentuating automatic stability characteristics is nothing less than stabilizing in its most limited sense.

24. In the first paragraph of page 479, with regard to blind flying, the Court of Appeals continues to make the error that the patent in suit is limited to maintaining equilibrium solely by the manipulation of the control levers; whereas, as a matter of fact, the patent in suit says nothing about the presence or absence of automatic stability. The Court says nothing about taking off and landing, or condi-

tions of turbulence of the air. The Court of Claims (Rec. p. 73), on the record before it, asked the pertinent question: "Why is it necessary to spend so much time instructing aeronautical pilots in the art of blind flying, as has been brought out by defendant's experts," if an airplane can be designed to fly itself. The record in this case before the Court of Claims establishes as a fact that the ailerons, elevator and joy-stick in the infringing machines operate to control the longitudinal and transverse equilibriums (Findings XXI and XXII, Rec. pp. 22-24); and by Finding XI (Rec. pp. 15-16) establishes as a fact that in airplanes having inherent transverse and lateral stability, the joy-stick control of equilibrium is still present.

30. The Court of Appeals next discusses the claims in suit and, on the same theory—that modern airplanes fly themselves—finds no infringement. The findings on the record in this case are directly to the contrary, as just stated. The holdings of the Court of Appeals on this point were the result of its being led completely astray as to the ability of the modern airplane to balance itself without any aid from the ailerons, elevator and joy-stick. In the case at bar, evidence was presented to show the falsity of this idea, and the Court of Claims has in effect so found in Findings XI (Rec. pp. 15-16), XXI and XXII (Rec. pp. 22-25).

The 1906 French Patent Is Neither Prior Art Nor the Equivalent Thereof.

The Court of Claims held that the joy-stick mechanism was patentable over the entire prior art, *including the 1906 French patent*. The Court of Appeals held that the 1906 structure was prior art to such an extent that it could be combined with the Laroze patent or other true prior art to constitute an anticipation of the patent in suit.

The facts are as follows:

The 1906 patent was applied for in France on December 19, 1906. The second and third French patents upon which the patent in suit is based were applied for in France in

January, 1907 (19th and 22nd). All of the applications were co-pending.

The patent in suit was applied for January 16, 1908, or within the year allowed by Section 4887, R. S., and the International Convention. Under these the application for the patent in suit dates back *for all purposes* to January 19th and 22nd, 1907. The 1906 French patent was issued and published February 18, 1907, or about one month later than the effective date of the application for the patent in suit. Consequently, the French 1906 *patent* cannot be actual prior art. It was neither prior nor art, for it was later than the effective application date here.

The 1906 structure may be treated as an invention in the same sense as it would be if it were true prior art patented or published ten or twenty years before the invention in suit. In this case it would be proper to combine it with any other true prior art for the purpose of fabricating whatever anticipation the facts permitted.

Or it may be treated, as Section 4887, R. S., appears to provide, as a measure to show what cannot be patented here. So interpreted its only pertinence in the case at bar is for comparison with the joy-stick invention to ascertain whether the latter is the same invention as that shown by the 1906 structure or not. If the joy-stick invention upon such comparison proves to be the same structure in substance, it cannot be patented here. If it proves to be a substantially different structure, it can be patented here.

Respondent's contention is that the latter interpretation is correct. Section 4887, R. S., does not deal with anticipation at all. It deals with the forfeiture or dedication of rights which were possessed by the applicant. Section 4886 deals with the conditions necessary to secure a valid patent by anyone, whether a citizen or an alien. Section 4887 has has to do with a special condition of forfeiture. If that condition of forfeiture does not exist, that part of Section 4887 which deals with it becomes inoperative.

Applying these principles to the present case it results that if, upon comparison of the invention of the patent in

suit with the 1906 structure, the former is found to be a different invention, then the 1906 structure has no further pertinence in this case.

To put the matter in another way: Section 4887 does not deal with the question of whether or not the patent in suit shows invention over the 1906 structure plus any conceivable structure which might be built up thereon by recourse to the prior art. Once it is determined that the joy-stick structure is not the same invention as the 1906 structure, the question of anticipation should be ascertained under the provisions of Section 4886.

Any comparison of the 1906 structure with the structure of the patent in suit shows that the 1906 structure is a two-handed control of equilibrium, while the joy-stick structure is a one-handed control. The 1906 structure is not self-indexing and does not follow the tilt of the plane; the joy-stick structure is self-indexing and follows the tilt of the plane. The 1906 structure does not operate in accordance with the balancing instinct of the pilot as to its longitudinal control: the joystick structure operates in accordance with this principle as to all types of control. There seems no question but that, when the 1906 structure alone is considered, the joy-stick structure is not the same invention.

The 1906 structure was not patented here and of course the United States public has the right to use it. The respondent could not patent it here. But the patent in suit does not pretend to cover the 1906 structure. No claim in the patent in suit includes that structure.

The contention of respondent is that this dedication or abandonment of the 1906 structure taking place ten months after the effective date of the application here of the patent in suit constitutes no warrant for using this 1906 structure as a part of the prior art. It was not in the public domain until after the effective date of the application for the patent in suit. It was not the work of another prior to the invention of the patent in suit. If the 1906 structure had, in fact, been the work of another it could have no effect whatever upon the validity of the patent in suit.

The Courts in many cases prior to the present form of Section 4887 were called upon to interpret substantially the first paragraph of this section. They universally held that this paragraph did not apply to any invention which was not the *same invention* as that applied for abroad.

The test invariably set up was as follows: Is the invention of the patent in suit the same invention as that previously patented abroad? If it is the same invention, the patent in suit is limited to expire with the foreign patent. If it is not the same invention, the patent in suit is not so limited.

Among the many cases decided by the Courts on this point, see the following:

Leeds & Catlin v. *Victor*, 144 O. G. 1089 (213 U. S. 301);
Hennebique v. *Myers*, 172 Fed. 869;
Victor v. *Hoschke*, 188 Fed. 326;
Acme v. *Commercial*, 192 Fed. 321; and
Fireball v. *Commercial*, 239 U. S. 156.

Under the present Act of 1897, see

General Electric Co. v. *Alexander*, 277 Fed. 290, aff'd 280 Fed. 852 (C. C. A. 2nd).

It is clear from these decisions that the first paragraph of Section 4887 deals only with the *same invention*.

The comparisons in these cases made by the Courts were essentially to determine the presence or lack of identity. They had nothing to do with the questions of validity or anticipation. Such comparisons were similar to the examination of two deeds, to ascertain whether or not they related to the same piece of realty, with no intention of determining whether either was valid.

The loss of the right to patent the 1906 structure in the United States, as a matter of equity, is a proper penalty for respondent's failure to apply for a patent here on that structure. The law does not favor forfeitures, and certainly not beyond those which are strictly necessary to conform to

the wording of a statute. If, in addition to the loss of rights in the 1906 structure, this structure be made an element in an attempt to destroy respondent's rights under the invention of the patent in suit, this would be carrying the penalty beyond any needed or appropriate purpose.

At the time of the filing of the second French application, respondent stood in the position of being sure of a patent in the United States on the joy-stick mechanism provided he filed within the year from the date of such second application. He also stood in the position of being sure that, if he did not file an application for the 1906 structure within a year from the date of that application, that structure would be abandoned. He conformed to the statute and to the International Convention as to the joy-stick mechanism, but he did not forfeit the 1906 structure here until ten months later than the effective date of the joy-stick application here in the United States. Certainly, respondent had no intent to abandon more than the 1906 structure.

Without doubt the answer to the problem propounded is a matter of judicial interpretation. We submit that the interpretation should be such as to restrict the forfeiture to the structure forfeited, and should not be extended to place the forfeited structure in a position in all respects analogous to prior art.

If this interpretation prevails, any attempt to combine the 1906 structure with true prior art is excluded.

Conclusion.

Questions of validity, scope and infringement have long been held to be questions of fact. The findings of the Court of Claims, we submit, establish that the patent is valid and infringed.

The findings with regard to validity—while they do not specifically use the words, "the patent is valid"—are, we submit, inconsistent with any other conclusion. All of the defense patents which rightfully should be considered as part of the aviation art, and including respondent's 1906 French patent, are analyzed and found to lack very essential

features possessed by the patent in suit. In none of them is there a single control of equilibrium in any form—let alone a control by a hand lever, and especially by a vertical, universally-mounted hand lever. In none of them is there to be found the simple, direct control movements of the joy-stick which obviate any calculation on the part of the pilot as to the degree of elevator and aileron movement necessary to correct compound disturbances in attitude or to produce a compound tilt of the plane in maneuvering. In none of them is this simple, direct movement so combined with the airplane itself that the attitude of the airplane forms an unfailing index or indicator telling the pilot instantly in what direction he should move the control lever to effect any suitable correction or to make any conceivable maneuver. In none of them is the movement of the control lever or levers correlated with the instinctive balancing movements of the pilot.

It is obvious that these findings dispose of the question of invention as a fact.

One could not combine any two or more of the old controls to produce the joy-stick unless he had, first, the complete conception of the joy-stick combination.

The alleged anticipations of the type of Wadsworth and others are in alien arts. As to most, if not all, of them, the Court holds as a fact that they contain no suggestion or description of any use in aviation.

As to all of them, their mere existence would not in any way help the solution of the equilibrium control problem of aviation in the manner so successfully accomplished by the joy-stick mechanism.

There is no conflict between the Court of Claims and the Court of Appeals as to the fact that similar patents lie outside of the permissible prior art.

On the question of infringement, we submit that this is foreclosed since there are particular findings of fact (Findings XXI and XXII, Rec. pp. 22-25) which completely negative the claim of petition that the joy-stick mechanism in the infringing planes is not used for equilibrium or stabilizing purposes. If this mechanism in the infringing planes is used

for such purposes, the claim of non-infringement becomes completely untenable, even though the claims be strictly limited to the use of the joy-stick mechanism for stabilizing purposes. In addition, we have shown, we submit, that the claims are fairly entitled by their terminology, by the prior art, and by the patent itself, to an interpretation by means of which the patent in suit covers the use of ailerons, elevator and joy-stick for maneuvering as well as stabilizing. This is true since, no matter for what purpose these parts are used, they always perform precisely the same function—namely, that of turning the machine around its major axes.

The special defenses, such as the Ferber defense and the Bleriot defense, are shown to be baseless by the findings.

The first point of law involved in the petition—namely, that of intervening rights—is shown to be baseless by the fact that claim 2 existed in the case continuously since February 1, 1909, and, from that date on, to the issuance of the patent. Claims of the scope of claims 12 and 13 were continuously in the case down to the date of issue with the exception of a period of thirteen months—thus not conflicting with the rule in *Chapman* v. *Wintroath* (*supra*) and *Westinghouse* v. *Jeffrey-DeWitt* (*supra*), etc.

The second point of law—namely, that, because of the erasure of claims 12 and 13, the claims in suit cannot be interpreted broadly enough to cover petitioner's structures—is shown to be baseless: first, because the claims in suit are of the same scope as claims 12 and 13, and, second, for the reason that petitioner's planes are found as facts to contain the invention in suit, even though the claims are strictly limited to stabilization, to which petitioner insists they are restricted.

The third point of law—namely, that Section 4923, R. S., should be interpreted to let in the Ferber public use—is shown to be baseless since the substance of Section 4923, R. S., has been a principle of United States patent law for a hundred years, and the section makes no distinction as to where the foreign use is or who the inventor is.

The opinion of the Court of Appeals—probably because of the different record before that court—is shown to have been based largely on an erroneous state of facts, and in some part upon an erroneous conception of the law.

The rule, which has been enunciated by this Court so many times that it requires no citation of decisions, is that if the question of invention is in doubt, this doubt will be resolved in favor of the patent if the patented structure has supplanted previous inventions, provided that this commercial success cannot be attributed to other reasons than sheer merit. We doubt if this Court has had many cases before it wherein the universal adoption of the invention was more attributable to the merit of the device than is the invention at bar. The United States was struggling along with the second Wright and Curtiss controls until the United States entered the war and its forces arrived in France. By that time France had adopted the joy-stick control for all planes, wherein the strength of the pilot, operating through the joy-stick, was sufficient for control without unduly tiring the pilot. From that time on, apparently, the United States completely adopted the joy-stick to the exclusion of all other controls for such airplanes. There was no advertising, no pushing, or high-pressure form of introduction. For a period of nearly twenty years succeeding the entry of the United States into the war, the joy-stick control has never been supplanted. Indeed, it would be difficult to imagine, even as a possibility, a more effective, simple, self-indexing, instinctive and altogether desirable method of manual control. There is nothing left to be desired.

During all of this time the United States has used the joy-stick control, it has used precisely that combination which constitutes the most complete embodiment of the respondent's invention—namely, that in which the plane follows the tilt of the stick and in which the responses are instinctive. General Foulois, at the time Assistant Chief of the Army Air Corps, testifying for the petitioner, says of the joy-stick control (Rec. p. 51):

> "* * * I would say that the control that we are using to-day, as compared to the controls that we have used in the past, is much less complicated, much easier to learn, much easier to handle, and easier to operate and control your airplane in connection with

all the other various pieces of equipment and instruments that you have to handle in the plane.

* * * * * *

"I would say that the present stick control is the most satisfactory control we have ever had from the standpoint of operating your airplane, and from the standpoint of minimum amount of attention which may be required to operate all the other various pieces of equipment that you have in a plane to take care of."

We submit that, if the question of invention of the patent in suit were in doubt, the success attained, as above referred to, should surely resolve the doubt in favor of the patent.

The point of law which we have discussed with relation to the exact status of the 1906 patent is one which need not be determined if the Court agrees with us as to the above conclusions. We believe, however, that respondent's failure to patent here the crude, two-handed 1906 structure should impose on him no severer penalty than the loss of the rights to that structure. Since the applications were co-pending, since the United States application on his second and third French patents was entitled to date anterior to the issuance of the 1906 French patent, and since the actual forfeiture was not until ten months later, we see no justice in treating this 1906 structure as though it were part of the prior art and thereby attempting to break down the patent in suit by combining it with other art.

The opinion of the Court of Claims and the authorities cited by it are believed in strict accordance with the facts and the law.

It is submitted that the decision of the Court of Claims should be affirmed as to the validity of all of the claims in suit and the infringement thereof by petitioner's planes.

New York, October 19, 1936.

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APPENDIX.

U. S. C., Title 28.

SECTION 288. *Certification to Supreme Court of questions of law; certiorari by Supreme Court to Court of Claims; no other review allowed.*

(a) In any case in the Court of Claims, including those begun under section 287 of this title, that court at any time may certify to the Supreme Court any definite and distinct questions of law concerning which instructions are desired for the proper disposition of the cause; and thereupon the Supreme Court may give appropriate instructions on the questions certified and transmit the same to the Court of Claims for its guidance in the further progress of the cause.

(b) In any case in the Court of Claims, including those begun under section 287, it shall be competent for the Supreme Court, upon the petition of either party, whether Government or claimant, to require, by certiorari, that the cause, including the findings of fact and the judgment or decree, but omitting the evidence, be certified to it for review and determination with the same power and authority, and with like effect, as if the cause had been brought there by appeal.

(c) All judgments and decrees of the Court of Claims shall be subject to review by the Supreme Court as provided in this section, and not otherwise. (Feb. 13, 1925, c. 229, § 3, 43 Stat. 939.)

SECTION 4886 (U. S. C., title 35, sec. 31). Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, or who has invented or discovered and asexually reproduced any distinct and new variety of plant, other than a tuber-propagated plant, not known or used by others in this country, before his inven-

tion or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor.

SECTION 4887 (U. S. C., title 35, sec. 32). No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless the application for said foreign patent was filed more than twelve months, in cases within the provisions of section forty-eight hundred and eighty-six of the Revised Statutes, and six months in cases of designs, prior to the filing of the application in this country, in which case no patent shall be granted in this country.

An application for patent for an invention or discovery or for a design filed in this country by any person who has previously regularly filed an application for a patent for the same invention, discovery, or design in a foreign country which, by treaty, convention, or law, affords similar privilege to citizens of the United States shall have the same force and effect as the same application would have if filed in this country on the date on which the application for patent for the same invention, discovery, or design was first filed in such foreign country, provided the application in this country is filed within twelve months in cases within the provisions of section forty-eight hundred and eighty-six of the Revised Statutes, and within six months in cases of designs, from the earliest date on which any such foreign application was filed. But no patent shall be granted on an application for patent for an invention or discovery or a

design which had been patented or described in a printed publication in this or any foreign country more than two years before the date of the actual filing of the application in this country, or which had been in public use or on sale in this country for more than two years prior to such filing.

SECTION 4923 (U. S. C., title 35, sec. 72). Whenever it appears that a patentee, at the time of making his application for the patent, believed himself to be the original and first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been known or used in a foreign country, before his invention or discovery thereof, if it had not been patented or described in a printed publication.

In the Supreme Court of the United States

OCTOBER TERM, 1936

No. 41

THE UNITED STATES, PETITIONER

v.

ROBERT ESNAULT-PELTERIE

ON WRIT OF CERTIORARI TO THE COURT OF CLAIMS

MOTION OF THE UNITED STATES TO AMEND ORDER.

Now comes the Solicitor General, on behalf of the United States, and moves that the order of this Court entered in the above cause on December 7, 1936, be amended by excluding therefrom the provision vacating the judgment of the Court of Claims and by adding a provision remanding the record to the Court of Claims with directions to make additional findings of fact in conformity with the opinion of this Court and thereupon to return the record to this Court.

STANLEY REED,
Solicitor General.

DECEMBER 21, 1936.

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In the Supreme Court of the United States

OCTOBER TERM, 1936

No. 41

THE UNITED STATES, PETITIONER

v.

ROBERT ESNAULT-PELTERIE

ON WRIT OF CERTIORARI TO THE COURT OF CLAIMS

MEMORANDUM IN SUPPORT OF MOTION TO AMEND ORDER

This Court on December 7, 1936, vacated the judgment herein and remanded the cause to the Court of Claims for such proceedings in harmony with the opinion of this Court as the Court of Claims may determine, and with instructions that it specifically find whether plaintiff's patent in suit is valid and if found valid whether it was infringed by the defendant.

Under circumstances similar to those presented here, this Court has at times retained jurisdiction of the case while remanding it to the Court of Claims, and has in its order of remand expressly

directed that court to return the record to this Court, with additional findings of fact. *United States* v. *Adams*, 6 Wall. 101; *United States* v. *Adams*, 9 Wall. 661; *Ripley* v. *United States*, 220 U. S. 491. In the case last cited this procedure was described by the Court as "the approved practice" (p. 496). It is submitted that this procedure would be appropriate in this case. It has not been suggested that the evidence before the Court of Claims, upon which its subsidiary findings are based, is inadequate to form the basis of the findings required by this Court. In view of the limited purpose of the remand, the form of order herein proposed would render the subsequent proceedings both adequate and expeditious.

The situation presented here is different from that involved in *Duke Power Co.* v. *Greenwood County*, No. 32, decided on December 14, 1936. In the latter case, the appellate court had remanded the case to the trial court because of supervening events occurring subsequently to the decree. Here, the case is being remanded solely for a clarification of the findings. Moreover, distinct rules of procedure may well apply to cases originating in the Court of Claims, since the evidence in such cases is not sent to this Court, the record being limited to the findings of fact and conclusions of law.

It is respectfully requested that the order of this Court be amended accordingly.

STANLEY REED,
Solicitor General.
JAMES W. MORRIS,
Assistant Attorney General.
DRURY W. COOPER,
ALEXANDER HOLTZOFF,
Special Assistants to the Attorney General.

DECEMBER 1936.

U. S. GOVERNMENT PRINTING OFFICE: 1936

CITATIONS.

	PAGE
Ripley v. United States, 220 U. S. 491	2
United States v. Adams, 6 Wall. 101	2
United States v. Adams, 9 Wall. 661	2
United States v. Gleason, 124 U. S. 255	2
Winton v. Amos, 255 U. S. 372	2

IN THE

Supreme Court of the United States

OCTOBER TERM, 1936.

THE UNITED STATES OF AMERICA, Petitioner, vs. ROBERT ESNAULT-PELTERIE, Respondent.	No. 41.

RESPONDENT'S MEMORANDUM ON PETITIONER'S MOTION.

IF YOUR HONORS PLEASE:

Counsel for respondent received at 11.30 A. M. on Monday, December 21, 1936, telegraphic information from the Solicitor General that he was presenting a motion to this Court to amend its decision of December 7, 1936, the gist of the motion being given. Counsel received a copy of the motion and petitioner's memorandum on Tuesday, Decem- 22, 1936, and this morning received a printed copy of the motion and memorandum.

Counsel for respondent beg leave to file the succeeding memorandum in typewritten form. It will be followed as soon as possible by printed copies.

Petitioner's motion evidently proceeds on the theory that this Court was inadvertently in error in writing its decision of December 7, 1936. This is not respondent's understanding.

This Court had before it and cited its decision in *United States* v. *Adams*, 6 Wall. 101; also in *United States* v. *Adams*, 9 Wall. 661, and *Ripley* v. *United States*, 220 U. S. 491. These are the only cases relied upon by the petitioner in its memorandum in support of its motion.

It appears from these cases that where this Court wishes to retain jurisdiction, it specifically so states. In the case at bar the Court specifically vacated the judgment—doubtless by clear intent and not inadvertently.

That this Court has vacated a judgment or reversed a decree while remanding a case to a lower court is apparently shown in—

Winton v. *Amos*, 255 U. S. 372;
United States v. *Gleason*, 124 U. S. 255.

We submit that petitioner's motion should be denied.

Respectfully submitted,

CADWALADER, WICKERSHAM & TAFT,
Solicitors for Respondent.

EUGENE V. MYERS,
EDWIN J. PRINDLE,
R. KEITH KANE,
of Counsel.

Dated: New York, N. Y., December 23, 1936.

SUPREME COURT OF THE UNITED STATES.

No. 41.—October Term, 1936.

The United States, Petitioner, *vs.* Robert Esnault-Pelterie. } On Writ of Certiorari to the Court of Claims.

[December 7, 1936.]

Mr. Justice Butler delivered the opinion of the Court.

Respondent is a citizen and resident of the French Republic and authorized to sue the United States in the Court of Claims.[1] His amended complaint alleges a cause of action under the Act of June 25, 1910, as amended,[2] for the use and manufacture by or for the United States of a device covered by his patent No. 1,115,795 dated November 3, 1914, which describes means for the control of the equilibrium of airplanes by the simple oscillation of a single lever moving in all directions and operated by one hand. Defendant filed a general traverse. After taking evidence, the court made special findings and stated as its conclusion of law that the plaintiff was entitled to recover. It did not specifically find the patent valid or that defendant infringed it. The record does not show whether at first the conclusion of law contained any statement as to validity or infringement. Pursuant to stipulation and in accordance with its rule, the court postponed entry of final judgment pending the taking of testimony upon the question of compensation.[3] On defendant's motion, the court amended its conclusion of law to read: "Upon the foregoing special findings of fact, which are made a part of the judgment herein, the court

[1] Judicial Code, § 155, 28 U. S. C., § 261.

[2] Act of June 25, 1910, 36 Stat. 851, as amended by Act of July 1, 1918, 40 Stat. 705. 35 U. S. C., § 68.

[3] "In any patent suit it shall be competent for the parties to stipulate that the hearing in the first instance be limited to the issues of validity and infringement and when no such stipulation can be reached by the parties the court may order such procedure to be followed.

"If the patent is held valid and infringed by the United States the court shall so adjudge and the case shall thereafter proceed according to law". Court of Claims Rule 39.

decides as a conclusion of law that the plaintiff's patent is valid and has been infringed by the United States and that he is entitled to compensation therefor under the act of June 25, 1910 . . ." It filed an opinion in which it states: "In conclusion we hold that the patent in suit is valid and has been infringed by the defendant." — C. Cls. —, —. The court entered judgment in accordance with the amended conclusion of law. We granted writ of certiorari.[4] 298 U. S. 653.

Plaintiff's contentions are based on claims 2 and 5 to 9. Claim 2 is: "An aeroplane having distortable wings for maintaining transverse stability, a rudder for maintaining longitudinal stability, a lever controlling said wings and said rudder, a steering rudder, and a separate lever controlling said steering rudder." Claim 5 is: "In an aeroplane, the combination of means for producing lateral stability, means for producing longitudinal stability and a single vertical lever movable in every direction for operating both said means for producing lateral stability and said means for producing longitudinal stability." Each of the other claims relied on contains the substance of claim 5 with variations and additions not here important.

On the facts found the petitioner contends: Respondent's patent is invalid as claiming a device not patentable over prior disclosures. No element of invention is found in the asserted instinctive character of the operation of the control lever. The patent, if held valid in any respect, should be limited to a combination comprising a pair of vertical control levers with a single integral or unitary tail surface of an airplane, and so construed is not infringed. The vertical control lever did not constitute invention over the structure disclosed in the respondent's 1906 French patent, application for which was filed more than one year before that for the patent in suit.[5] The

[4] "In any case in the Court of Claims . . . it shall be competent for the Supreme Court, upon the petition of either party, . . . to require, by certiorari, that the cause, including the findings of fact and the judgment or decree, but omitting the evidence, be certified to it for review and determination with the same power and authority, and with like effect, as if the cause had been brought there by appeal". § 3 (b), Act of February 13, 1925, 43 Stat. 939. 28 U. S. C., § 288.

[5] "No person otherwise entitled thereto shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been first patented or caused to be patented by the inventor or his legal representatives or assigns in a foreign country, unless

claims are not supported by the disclosure. Plaintiff's patent is invalid because the claims on the control lever were not inserted in the application until five and one-half years after filing, while the device came into general use in the United States prior to that time.

Validity and infringement are ultimate facts on which depends the question of liability.[6] In actions at law they are to be decided by the jury. If the evidence is not sufficient to establish validity and infringement, it is the duty of the trial court to direct a verdict for defendant.[7] Similarly a judgment upon a special verdict cannot be sustained unless the findings extend to all material issues.[8] The same principle governs in cases brought here from the Court of Claims.[9] On writ of certiorari to that court, the record is required to include the pleadings, findings of fact and the judgment. The opinion, if any, is also included. The findings are required to be in the nature of a special verdict and specifically to set forth the ultimate facts; the evidence is not brought up.[10] As by its general traverse defendant put in issue all allegations of the complaint, the findings in order to be sufficient to sustain judgment for plaintiff must specifically decide questions of validity and infringement, and also include circumstantial facts sufficient to

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the application for said foreign patent was filed more than twelve months, in cases within the provisions of section 31 of this title, . . . prior to the filing of the application in this country, in which case no patent shall be granted in this country. . . .'' R. S., § 4887, (§ 25, Act of July 8, 1870, 16 Stat. 201) as amended by § 3, Act of March 3, 1897, 29 Stat. 693 and § 1, Act of March 3, 1903, 32 Stat. 1225. 35 U. S. C., § 32.

[6] Wood *v.* Underhill, 5 How. 1, 5-6. Battin *v.* Taggert, 17 How. 74, 85. Bischoff *v.* Wethered, 9 Wall. 812, 814. Keyes *v.* Grant, 118 U. S. 25, 37. Haines *v.* McLaughlin, 135 U. S. 584, 597. St. Paul Plow Works *v.* Starling, 140 U. S. 184, 196-197. Coupe *v.* Royer, 155 U. S. 565, 577, *et seq.* United States *v.* Anciens Etablissements, 224 U. S. 309, 322. Thomson *v.* Ford Motor Co., 265 U. S. 445, 446. Stilz *v.* United States, 269 U. S. 144, 147.

[7] Black Diamond Co. *v.* Excelsior Co., 156 U. S. 611, 618. Gunning *v.* Cooley, 281 U. S. 90, 93-95. Cf. Keyes *v.* Grant, 118 U. S. 25, 36-37. Royer *v.* Schultz Belting Co., 135 U. S. 319, 325.

[8] Chesapeake Insurance Co. *v.* Starke, 6 Cranch 268, 273. Prentice *v.* Zane's Administrator, 8 How. 470, 484. Graham *v.* Bayne, 18 How. 60, 63. Burr *v.* Des Moines Co., 1 Wall. 99, 102. Ward *v.* Cochran, 150 U. S. 597, 608. Luckenbach S. S. Co. *v.* United States, 272 U. S. 533, 539. Clementson, Special Verdicts, p. 204.

[9] Mahan *v.* United States, 14 Wall. 109, 111-112. Luckenbach S. S. Co. *v.* United States, 272 U. S. 533, 539.

[10] § 3 (b), Act of February 13, 1925, 43 Stat. 939. 28 U. S. C., § 288. Rule 41, pars. (3), (4).

warrant the court's conclusion in respect of the main issues.[11] The special findings may not be aided by statements in the conclusions of law[12] or the opinion of the court[13] to the effect that the patent is valid and infringed.

The court having failed to find that the patent was valid or had been infringed, the judgment cannot be sustained unless upon inspection of the findings of fact it is plain that they are sufficient to compel decision of those issues in favor of plaintiff.[14] The contentions of the parties—briefly above indicated—raise complicated and difficult questions affecting validity and infringement. There are 47 findings of fact covering more than 32 pages of the record and by reference including 28 exhibits on 266 pages. The failure of the lower court to make specific findings upon the main issues does not lay upon this court the duty of examining, analyzing and comparing the circumstantial facts found to ascertain whether as a matter of law they establish validity and infringement.[15]

The judgment will be vacated, the case will be remanded to the Court of Claims for such proceedings in harmony with this opinion as that court may determine, and with instructions that it specifically find whether plaintiff's patent in suit was valid and, if found valid, whether it was infringed by the defendant.[16]

It is so ordered.

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[11] Anglo-American Land, M. & A. Co. *v.* Lombard, 132 Fed. 721, 734. See Ross *v.* United States, 1[illegible] C. Cls. 565, 571, 572. Clementson, Special Verdicts, pp. 209, 215.

[12] French *v.* Edwards, 21 Wall. 147, 151. Sun Mutual Ins. Co. *v.* Ocean Ins. Co., 107 U. S. 485, 501-503. Kealing *v.* Van Sickle, 74 Ind. 529, 536. Knight *v.* Kerfoot, 184 Ind. 31, 39. Houtz *v.* Union Pac. Ry. Co., 33 Utah 175, 195.

[13] Stone *v.* United States, 164 U. S. 380, 383. Crocker *v.* United States, 240 U. S. 74, 78. Brothers *v.* United States, 250 U. S. 88, 93. United States *v.* Wells, 283 U. S. 102, 120.

[14] United States *v.* Pugh, 99 U. S. 265, 270. Ripley *v.* United States, 220 U. S. 491, 496. Winton *v.* Amos, 255 U. S. 373, 395. Botany Mills *v.* United States, 278 U. S. 282, 290. United States *v.* Wells, 283 U. S. 102, 120.

[15] United States *v.* Adams, 6 Wall. 101, 110, 111. Cf. Farmer's Guide Co. *v.* Prairie Co., 293 U. S. 268, 281.

[16] United States *v.* Adams, 9 Wall. 661, 663. Winton *v.* Amos, 255 U. S. 373, 395-396. Louis. & Nash. R. R. *v.* United States, 258 U. S. 374, 377. Fidelity & Deposit Co. *v.* United States, 259 U. S. 296, 303. Luckenbach S. S. Co. *v.* United States, 272 U. S. 533, 539. United States *v.* Jefferson Electric Co., 291 U. S. 386, 406.